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A GIGANTIC ACHIEVEMENT.

The brief dispatch sent out from Alpena a few days ago to the effect that Mr. Carlos D. Myers, of Cleveland, had descended over 100 feet in his diving machine and had come to the surface in safety, fell far short of demonstrating the extent of the achievement, or of its great importance.

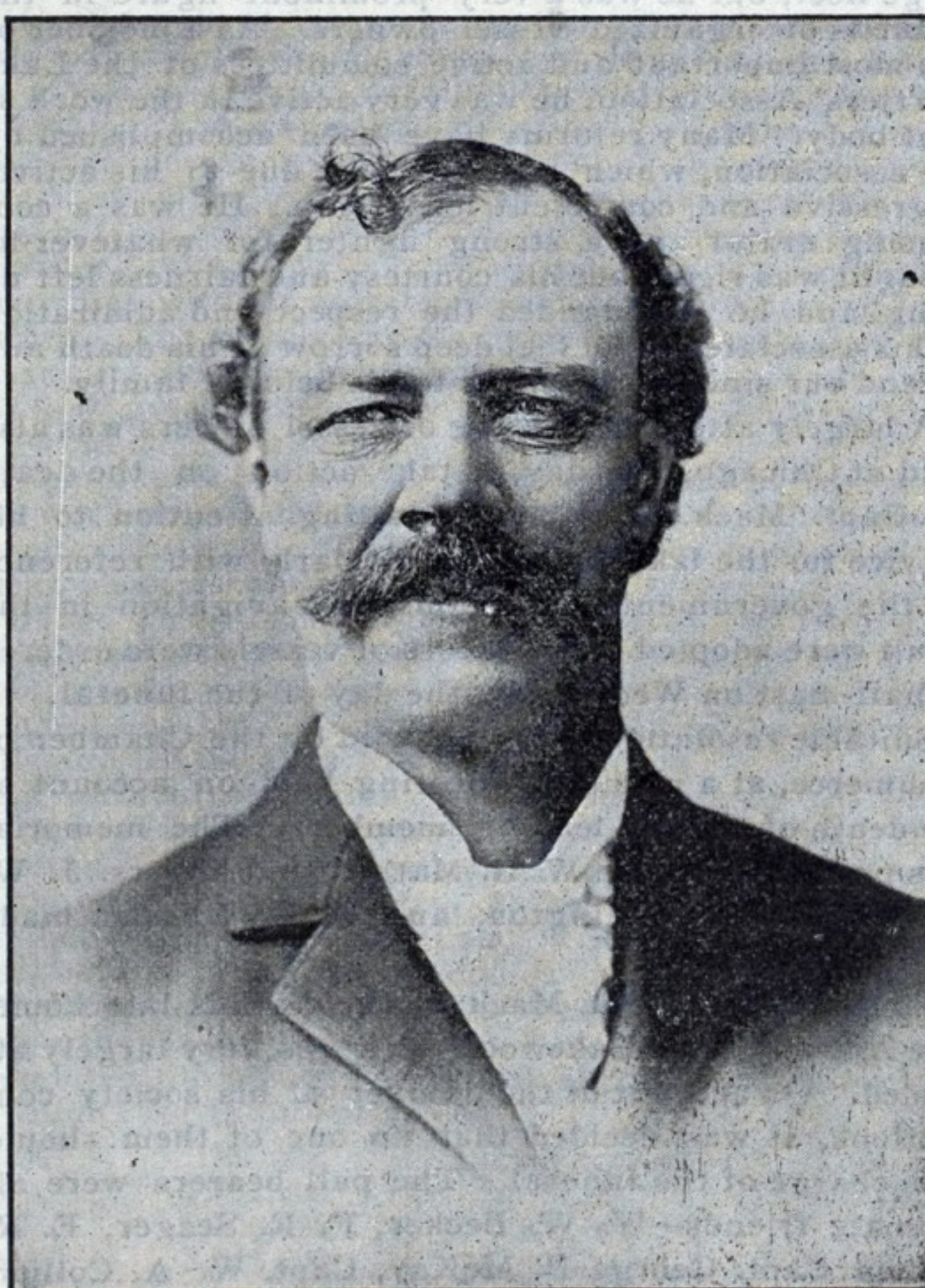
Mr. Myers visited Cleveland and THE RECORD office on Monday of this week, and announced that he had made a test trip on his machine, descending 225 feet to the bottom, off Thunder Bay. He remained below some two hours, wearing his ordinary summer clothing except for an all-wool suit of underwear, having taken this additional precaution because of an attack of malarial fever, from which he has not fully recovered. His stay was cut short by the extinguishment of his searchlight, which is in a separate chamber on the top of the machine. The tremendous pressure of the water at that depth forced out a part of the rubber gasket on which the search-light chamber was screwed down, and filled this little chamber with water, shortening the electric circuit and allowing the light to go out. Everything worked beautifully in the chamber proper, and the deficient gasket is to be replaced by one of soft rubber, with lips upon which the water-pressure will act only to make the seam more secure.

The true value of the achievement is only realized when it is stated that the lowest depth ever reached by a man who returned alive to the surface was 200 feet. One of the few who have ever reached this depth is Andrew Cameron, of Glasgow, who has contracted to go down to the wreck of the Cape Liner Drummond Castle, which sank off Ushant, on the Coast of France, a few months ago, with great loss of life. She lies in 180 feet of water. Mr. Cameron has remained half an hour at 200 feet depth, but this is the extreme limit of time, while in Mr. Myers' machine, the length of stay is only limited by conditions which would apply to confinement in a small room on the earth's surface. The machine and its appurtenances are tested to successfully resist water pressure at 1,000 feet depth, and Mr. Myers will make a second descent in water of 500 feet depth at the first favorable opportunity afforded by the weather.

Mr. Myers' exploit has been compared with the maximum feats of men in diving suits, but it must be pointed out that these deep descents have been made in only very exceptional cases, and for such brief periods as to leave the trips really without practical result. The British Admiralty limit their seamen divers to 120 feet, and the leading wrecking firm of Siebe, Gorman & Co., London, limit good divers, with the best suits and apparatus, to 140 feet as a rule, although in the memorable case of the Alphonso XII., one of their divers, the late Alexander Lambert, did brilliant service at a depth of 160 feet. Lake divers have been dragged out dead after descending only 60 or 80 feet, and the lowest depth to which an average diver will descend is about 50 feet. The members of the profession have always been short-lived, because of the frequent accidents, and the deleterious effect upon the system of working under such great external pressure on all sides. In Mr. Myers' machine there is only about five or ten pounds extra pressure of air, which, being both internal and external, is not perceptible. Anybody with the requisite amount of nerve can, therefore, make the descent; and there is

no ill effect upon the physical system. The liability to accidents is reduced to the lowest possible factor in the careful construction of the machine, which we are not yet at liberty to describe in further detail than was furnished in THE RECORD, December 26, 1895.

Mr. Myers descends with his present apparatus must be limited to 500 feet, as this is the length of his air-supply pipe, which is made after a very peculiar design at great expense. This is within 200 feet of maximum lake depths, however, so that the machine is suitable for all lake work. Mr. Myers worked for one and one-half hours in his machine, at a depth of 18 feet, without his air pumps going, being supplied, without discomfort by the air inside the chamber, and by what circulated of its own force through the tubes. His description of what he saw at the depth of 34 fathoms is most interesting. By the aid of his search-light he could see objects distinctly for a surprising distance. He saw the steep side of a reef rising out of the rocks at what



THE LATE CAPT. W. S. MACK.

appeared only a short distance away, but when men were sent out from the ship above to take soundings the reef proved to be more than one and one-half miles distant. After the search-light was extinguished, he could see a distance of 500 feet or more, as through a fog.

Mr. Myers has made his outfit more complete than had been at first intended for experimental purposes, but is now fully equipped for actual work on his submarine excursions. He is now making an effort to locate the sunken Menominee liner Norman, which he expects to find this fall, but wrecking operations on her will not begin before spring. The Norman is supposed to be in about 125 feet of water.

As heretofore stated, Mr. Myers' machine contains no elementary principles which are at all new, but his machine, in its combinations, is fully covered by patents; which have been obtained in this and foreign countries, and which will come to issue in a few days.

DEATH OF CAPT. W. S. MACK.

Capt. W. S. Mack died at his home in Lakewood at 10 o'clock a. m., Monday, Sept. 14. A second apoplectic stroke proved too much for him and he did not rally thereafter. His death was a sad shock to all his friends, who are legion and by no means confined to those engaged in marine commerce. Capt. Mack was an active member of several orders, and was very popular in his social, as in his business walks.

Capt. William S. Mack was born near Kingston, Ont., fifty-two years ago. He attended school at Kingston, but engaged in sailing early in life and very soon became an American, and by the time he was twenty years old became the master of the schooner Norwegian, sailing out of Oswego. He sailed other small craft until 1881, when he entered the employ of Capt. Alva Bradley, sailing the steamer Fred Kelley. From 1882 to 1884 he commanded the wooden steamer Republic, now known as the Marquette, and, in 1885 sailed the Raleigh. He then sailed for John Corrigan, and later superintended the construction of the steamer Aurora, which was built in 1887 by Murphy & Miller. He then entered the C. J. Kershaw as master and managing owner, towing the two schooners Moonlight and Iron-ton, in which he was also interested. His unremitting energy and fine business capacity made these a source of good profits, and he later purchased the schooner Pelican. All these have had their day save the schooner Moonlight, which is now the property of J. C. Gilchrist. As the old boats earned more money, Capt. Mack continued to invest in craft of larger capacity and newer build. He bought the V. H. Ketchum from Pickands, Mather & Co., and ordered the schooner W. D. Becker built at James Davidson's yard. His later purchases were the Wadena, the P. P. Pratt and Anna M. Ash, and finally the G. W. Roby.

Capt. Mack's business methods have nominally kept him in some debt, but at no time has he been in any degree involved. If he found that he could earn a large percentage on money which it would cost but a small interest to borrow, he did not hesitate to procure funds. His investments were very rarely speculative, but he has been active and hard working when others are slow, and while carried off in the prime of life he leaves, when the estate is settled, not only a snug fortune to his wife, son and daughter, but a remunerative business as well, which will be carried on by his son, Mr. Will Mack, who has been associated with him for a number of years.

Capt. Mack's prominence in the Lake Carriers' and Ship Masters' associations, and in all movements for needed aids to or reforms in lake navigation are too well known to require extended mention here. He realized keenly the fact that somebody must do active work to bring about desired results, and when he saw all others held back, he came to the front and took a leading part at the risk of being called officious by his more indolent colleagues. But while always urging that desired objects must be attained, he has never put his opinions above those of others who were in a position to be equally as well informed as to what was needed nor as to how it should be secured.

To monuments to Capt. Mack's energy are the White law and the Rules for Navigation of St. Mary's River. In both cases the needs of special legislation was unanimously admitted. Capt. Mack went to work to secure it. But a very large part of the work was to secure the opinions of others, representing all interests, and to reconcile them. He had, of course, his own opinions, and when controversies came, he took sides; but he was

always ready to yield in his own private ideas, provided his opponent was on the side of safety.

SHIPMASTERS' RESOLUTIONS.

At a meeting of the Ship Masters' Association, Cleveland Lodge No. 4, called Tuesday for the purpose of taking action regarding the death of Capt. William S. Mack, Past Grand President C. E. Benham was in the chair. The following resolutions were unanimously adopted, and were ordered spread upon the records of the lodge, and that an engrossed copy be presented to the wife and family:

"Whereas, In the death of Capt. William S. Mack, past president of this lodge, and worthy first vice-president of our grand lodge, and who has occupied many of the important offices of the association, the association loses an efficient and valuable member, whose work in framing rules and regulations in lake commerce and in aiding their passage as laws at Washington was of signal value and importance.

"Resolved, That in his death, not only the association will sustain a great loss, but the grand lodge (deeply mindful of the valuable work in the past in its behalf) will have cause to mourn his absence in its future deliberations.

"Resolved, That as a brother member, and one of the most able masters of the association, the individual members will miss him, and it is herewith ordered, as a token of respect, that all association pennants be carried at half mast on the day of the funeral, and that the charter of our lodge be draped in mourning for a period of sixty days.

"Resolved, That our fraternal and personal sympathy be extended to the wife, son and daughter in their deep affliction in the loss of a loving husband and kind father."

C. E. BENHAM, Past Grand President.

CAPT. JAMES STONE,

CAPT. JOHN LOWE,

CAPT. JOHN MITCHELL,

CAPT. JOHN W. MOORE,

CAPT. GEORGE P. MCKAY,

Committee.

LAKE CARRIERS' RESOLUTIONS.

A meeting of the Lake Carriers' Association was held in the office of General Counsel Harvey D. Goulder, Tuesday, for the purpose of taking action commemorative of the late William S. Mack. The meeting was one of the largest ever held on a similar occasion, testifying to the high esteem in which Captain Mack was held by his associates.

A committee was appointed and arrangements made to provide suitable floral emblems, and it was decided that every vessel owner who should be in the city be requested to attend the funeral of Captain Mack, at 2 o'clock on Wednesday, from his late residence on Detroit road.

A committee on resolutions was appointed, which reported the following, which were unanimously adopted:

"Captain William S. Mack was so well-known in marine circles, so closely identified with the interests of lake commerce in every branch, so active, energetic and influential, and held in such high regard by all of us, that it seems almost commonplace to adopt any formal expression of tribute to his memory.

"He began life with nothing but his intelligence, untiring energy, zeal and strong character. He rapidly won his way as a sailor to the position of master, filling each station with marked ability. By thrift he was able to secure a small interest, and with fine business tact and ability he rapidly increased his holdings until at the time of his death he was an extensive owner and successful manager.

"For many years Capt. Mack, with the Cleveland Vessel Owners' Association, and later with the Lake Carriers' Association, was one of the leading spirits in every movement for the encouragement of lake commerce. He was generally chosen on committees for securing aids to navigation, the removal of obstructions from channels, the procuring of additional lighthouses, buoys, life saving stations; he was always in demand to go with delegations to Washington on public business connected with the lakes; was called to assist in framing rules and regulations, and it was characteristic of him that he was prepared and equal to every demand, ready and willing at all times, and at whatever personal inconvenience, to contribute his time and his means to the accomplishment of any of these purposes.

"There never was a finer example of the traditional great hearted, generous sailor; never a truer, more steadfast friend; never a more tolerant and generous opponent; never a braver or truer man than our late friend Capt. Mack. Therefore be it

"Resolved, That it is with a sense of deep personal loss that we mourn the death of Capt. Mack, realizing that while the lake commercial interests have lost a most influential factor, each of us has lost a valued friend.

"That we extend heartfelt sympathy to the widow and family of the deceased, who have lost a noble husband and kind and indulgent father, their strong counselor, guide and support.

"That the vessel owners of Cleveland attend the funeral in a body, and that the secretary of this meet-

ing be directed to send an engrossed copy of these resolutions to the family and to furnish copies to the press."

AT DETROIT AND ELSEWHERE.

A meeting of vessel owners was held at Detroit, Wednesday, to take action in regard to the death of Capt. William S. Mack. A committee composed of A. A. Parker, John C. Shaw, W. A. Livingstone, J. W. Westcott and Thos. Adams, drew up the following resolutions:

"Whereas, The demise of our late honored, respected and beloved associate, William S. Mack, of Cleveland, has come as a personal loss to each of the vessel owners and masters of this port, and, while recognizing the unimportance of words on this occasion, we feel it a privilege to give some testimony as to the grounds upon which rest the high regard in which we hold his memory. Therefore, be it

"Resolved, That in the death of Capt. Mack the vessel owners and navigators, not only of Cleveland but of all the lake ports, have lost an ever ready champion of their rights, to whom they have never applied in vain when their interests demanded a sacrifice of his personal interest, time and energy for the benefit of the whole.

"We recognize that in his death not only have we lost a noble and large minded associate, but also that the loss must necessarily be more keenly felt by others, and we therefore extend our sincere and heartfelt sympathy to his immediate family, who must suffer a loss which none could appreciate except themselves who have had the privilege of a holy and intimate association with him, whose noble heartedness was everywhere recognized."

It was adopted as the sense of the meeting that vessels generally be requested to carry their colors at half-mast during Wednesday out of respect to his memory.

At a meeting of the many friends of the late Capt. W. S. Mack among the vesselmen of Buffalo, on Monday, the following resolution was adopted:

Capt. William S. Mack, who died at Cleveland this morning, was one of the foremost men engaged in lake transportation. Not only was he managing owner of a large fleet, but he was a very prominent figure in the councils of organized vessel owners. As a member of the most important and active committees of the Lake Carriers' Association, he was very active in the work of that body. Many reforms have been accomplished by the association, which were largely due to his active, aggressive and competent leadership. He was a convincing orator and a strong fighter for whatever he thought was right, but his courtesy and fairness left no sting, and he commanded the respect and admiration of his associates. We feel deep sorrow at his death and extend our sincere sympathy to his beloved family.

A largely attended meeting of vessel owners was also held at Chicago, Tuesday, to take action on the death of Capt. Mack. Resolutions calling attention to his service for the lake marine, particularly with reference to the government regulations of navigation in the Sault were adopted. The colors of vessels were ordered at half-mast on Wednesday, the day of the funeral.

Suitable resolutions were adopted by the Chamber of Commerce, at a memorial meeting held on account of the death of several leading members. The memorial was presented by Mr. W. G. Mather, and Messrs. J. W. Walter, B. L. Pennington, and C. E. Wheeler made feeling addresses.

The funeral of Capt. Mack was held at his late home, The Anchorage, in Lakewood, and was very largely attended. On account of the number of his society connections, it was decided that no one of them should take charge of the funeral. The pall bearers were all intimate friends—W. W. Becker, F. R. Seager, E. R. Damon, Capt. George P. McKay, Capt. W. A. Collier, and H. D. Goulder.

DEATH OF CAPT. H. J. WEBB.

Capt. H. J. Webb, of the pioneer vessel brokerage firm of H. J. Webb & Co., Perry-Payne Building, Cleveland, died at 5 o'clock Tuesday evening, at his home, No. 1603 Euclid avenue. The immediate cause of his death was heart failure, but Capt. Webb has been a sufferer from Bright's disease for several years, his illness compelling him to spend one entire summer in Carlsbad, a few years ago. Death came very suddenly, Capt. Webb having returned at 4 o'clock from a drive, in usually good spirits.

Henry J. Webb was born in Pot-dam, St. Lawrence county, New York, April 16, 1832. His parents were Henry B. and Emily Carpenter Webb. His father was in business there, but a few years later returned to Montpelier, Vt., his birthplace, and remained there until 1853, when he removed to Blissfield, Lewance county, Mich.

In Capt. Webb's boyhood days, chiefly spent in Ver-

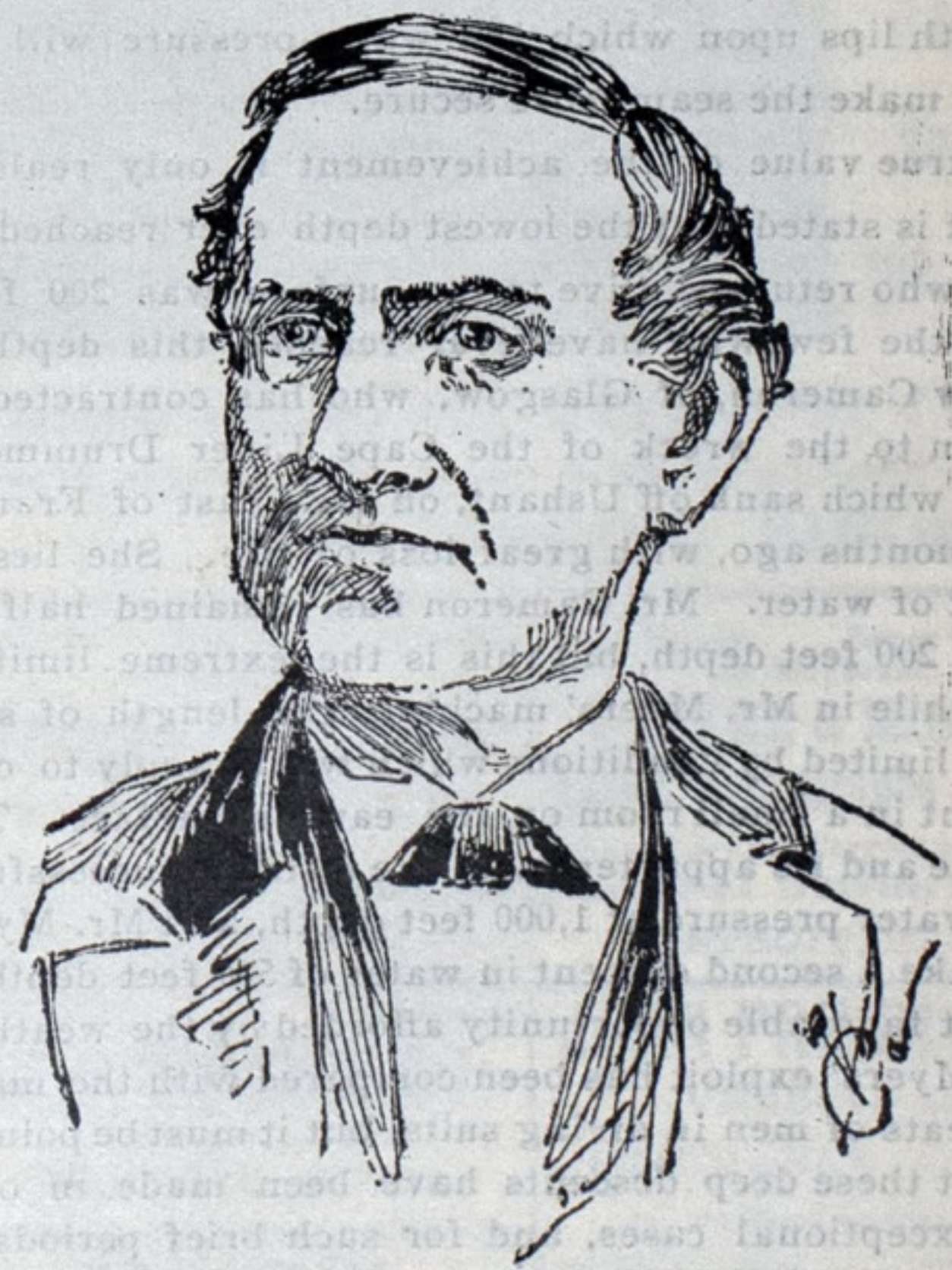
mont, school advantages were very limited. Besides, it was necessary that each member of the family should shift for himself as soon as he was old enough. However, he improved to the utmost his opportunities for schooling, and soon after his father moved to Michigan, engaged in the dry-goods business. In 1848 he went to Toledo, and two years later came to Cleveland. He remained in the dry-goods business for a time, but later engaged in the stone trade, chartering a good many vessels. He then saw that there was money in the vessel brokerage business and in 1856 opened the first office of that nature in Cleveland. He has continued in this business for forty years, and has accumulated a moderate fortune, although he has in past years been a wealthier man than at the time of his death. Capt. Webb was twice married. His wife and a son and daughter survive him.

Capt. Webb was personally known to almost every master on the Great Lakes, and to many of the subordinate vessel officers. He was noted for his kindly nature, and while always keen in his business dealings he was friends with everybody. He has been sadly missed during the period in which his ill-health prevented attention to business, and now that he is gone his loss will be sincerely mourned. His funeral will occur at 2 o'clock this (Thursday) afternoon.

DEATH OF CAPT. ALLEN KIRBY.

Capt. Allen M. Kirby, one of the best-known of the earlier lake masters, died last Saturday morning at his room above the office of the Wyandotte shipyard of the Detroit Dry-dock Co. He was an uncle of Frank E. Kirby, of the company. Capt. Kirby had not been in good health for two years past, but took to his bed soon after the launch of the Sir William Fairbairn, with a complication of diseases to which his great age made him readily succumb.

Capt. Kirby was born at Nantucket, Mass., February 28, 1822. As the whole island population was then amphibious, his childhood was spent among the boats, and he took to sea at the early age of thirteen years, shipping as cabin boy. Eleven years later, or in 1846, he left the salt water and went to Oswego, where he married. He continued to sail out of Oswego until 1860,



at which time he entered the employ of the late Jesse Hoyt, of Saginaw, sailing his vessels from that port. In 1872 he became connected with the shipyard at Wyandotte, and has remained ashore most of the time since, sailing a trip occasionally as substitute for some regular masters. His work at Wyandotte was the making of hull models.

During the late war Capt. Kirby was in charge of the wrecking tug Magnet, which was used to transfer Confederate prisoners between Johnson's Island, near Sandusky. He was noted for his care in navigation, and few men kept better posted on lake affairs. He continued to take out master's papers every year. He suffered for some years from a cancer of the jaw. It was cut out a few years ago.

Capt. Kirby's wife died three years ago. Four children survive him—Edward A., of Detroit; Gilbert L., chief draughtman at the Mare Island Navy Yard; Austin Eugene, of New York, and Mrs. Sarah B. Stone, of Saginaw.

NEWS AROUND THE LAKES.

CHICAGO.

SEVERAL PASSENGER STEAMERS PREPARING TO GO INTO WINTER QUARTERS—DEATH OF CAPTAIN OLE ROBENSON.

Special Correspondence to The Marine Record.

OFFICE OF THE MARINE RECORD,)
CHICAGO, September, 16. }

The Goodrich Co.'s splendid twin-screw steel steamer Virginia made her last round trip for this season between Chicago and Milwaukee on Saturday last, and left here Sunday night, at 9 o'clock, for Manitowoc, where she will go into winter quarters. The Virginia is a great favorite with the traveling public, and has carried many thousands of excursionists, seeking a pleasurable outing during the season just ended. The Goodrich Co.'s steamer Sheboygan went into winter quarters at Manitowoc this week.

The yacht Siren won over the Charlotte B. again last Friday, under conditions almost diametrically opposite from those which obtained in the previous race of the Columbia Yacht Club, when the two boats were matched. In that race there was a strong land breeze and a smooth sea, while on Friday, the wind blew fresh from the north-east, a heavy fog overhung the lake, and the sea was running high for small boats. The Siren also won the Hening cup, the time prize for second, third and fourth-class sloops, in addition to the trophy in her own class. She was sailed by Capt. John Prindiville, who is known from one end of the lakes to the other as a crack yachtsman. He handled her in his old-time manner, making every move count, and her owners have every reason to be proud of the time she made.

Capt. J. S. Dunham, on behalf of his colleagues among the vesselmen and in the marine interests along Chicago River, has sent a letter of protest to Secretary Lamont against his delay in instructing Major Wm. L. Marshall to begin the dredging in the river, which was authorized by Congress last spring. The river has not for years been in a worse condition from deposits of mud and silt, and the big grain and coal-laden boats experience any amount of trouble.

The O. S. Richardson Fueling Co. have about 25,000 tons of Black Horse Coal, which has been brought here from the lower lakes, at their large new dock at the North pier, where any and all sizes of steam vessels can receive all the fuel they require, with quick dispatch, at all hours, day and night.

The H. H. Williams Trans. Co.'s steamer City of Kalamazoo will be taken off her route between South Haven and Chicago next Sunday, and will commence running between Muskegon, Grand Haven and Milwaukee, on Monday, taking the place of the steamer Nyack, which will go to Burger & Burger's shipyard at Manitowoc for alterations and a re-build.

Captain Ole Robenson, aged 76 years, died last Friday noon at his residence, No. 145 W. Huron street, of heart disease. He was one of the old-time captains, having come to Chicago about forty-five years ago from California. He was master and owner of the small schooners Venus and Three Bells, and part owner of the schooner T. W. Brown. He gave up sailing many years ago. The funeral took place Monday afternoon at Mount Olivet Cemetery, and was attended by many marine men, old friends of the deceased. He leaves a widow and two grown sons and daughters.

The schooner Nelson unloaded 1,468 tons of coal at the Dunham Towing and Wrecking Co.'s fueling dock, for the use of the company's tugs.

The news of the death of Captain W. S. Mack, at Cleveland, on Monday, was received here with feelings of the deepest regret by his many marine friends, by whom he was held in the highest esteem.

Grain freights hold steady at 1½¢ on corn to Buffalo. J. A. Calbeck & Co. chartered the W. P. Ketcham for wheat, South Chicago to Ogdensburg; George B. Owen, corn, South Chicago to Kingston, 2½¢; Jessie L. Boyce, clipped oats to Port Huron, 1¢.

Carr & Blair chartered the Progress for oats to Saratoga, 1½¢; Merida, corn, South Chicago to Buffalo, 1½¢; Lindsay, corn, to Port Huron, at 1½¢.

H. W. Cook & Co. chartered the steamer New Orleans for clipped oats to Sarnia, 1½¢; Onoko, corn to Fairport, 1½¢; George J. Boyce, for oats to Port Huron, 1½¢; Fred Pabst, corn to Buffalo, 1½¢.

Captain John Prindiville chartered the Lansing for clipped oats to Buffalo and Black Rock, 1½¢; Niko, Churchill and Cadillac, corn to Kingston, 2½¢; Inter-Ocean and Richard Winslow, corn to Port Huron, 1½¢; steamer Oscar T. Flint, corn to Port Huron, 1½¢.

WILLIAMS.

DULUTH AND SUPERIOR.

COAL RECEIPTS AT THE HEAD OF THE LAKES NEARLY DOUBLE THOSE OF LAST YEAR TO DATE—DEMAND FROM CONSUMERS VERY LIGHT—VALUABLE ORE AND WHEAT FIGURES.

Special Correspondence to The Marine Record.

DULUTH, Sept. 15.

According to the custom-house reports the coal receipts since the opening of navigation have been as

follows: April, 11,014 tons; May, 86,056 tons; June, 112,619 tons; July, 137,080 tons; August, 117,635 tons; total, 464,404 tons. During the same months last year they were: April, none; May, 8,400 tons; June, 33,225 tons; July, 91,136 tons; August, 138,331 tons; total, 271,092 tons. This is an increase of 193,312 tons, or about 72 per cent. The trade is, however, stagnant, and the recent advances in price have made the situation worse. If prices continue so high there will be a much larger consumption of wood during the coming winter, and next spring will find stockpiles well filled.

The total shipments of iron ore from Duluth and Two Harbors for the season to September 1 were 2,911,317 tons, compared with 2,548,069 tons for corresponding period last year, presenting an increase of 363,248 tons. There was a falling off of shipments for August, at the beginning of which month the general increase of Duluth and Two Harbors had been 545,887 tons and the prospects are the general increase shown at the beginning of September will be greatly reduced at the beginning of October. The shipments from Duluth to September 1 were 1,499,877 tons as compared with 1,069,119 tons for corresponding period last year, and shipments from Two Harbors to September 1 were 1,411,500 tons as compared with 1,478,950 tons for the corresponding period last year.

Wheat in store at the head of the lakes is apportioned among the various terminals elevator lines as follows: Belt Line, 566,341; Consolidated, 2,222,980; Globe, 2,232,868; Great Northern, 99,159; Superior Terminal, 419,574; Consolidated B, 68,972; Consolidated H, 253,653; total, 5,863,547. In store at Minneapolis, 5,863,547 bushels, a decrease of 143,430 bushels.

Owing to the enactment of the special tax law for vessels in Minnesota, the amount of vessel tonnage enrolled at Duluth has increased nearly 1,000 per cent in the last 14 months. On July 1, 1895, there were 58 vessels enrolled, and these were nearly all tugs and other small craft, the total tonnage being only 5,485.04 gross. On July 1, 1896, the records at the custom house showed an enrollment of 80 vessels with a total tonnage of 26,078.73 gross, an increase of nearly 500 per cent. This amount was nearly doubled during July and August, and on September 1, 51,184.85 tons gross, or 41,786.30 tons net is now enrolled. This means a revenue of \$1,253.60, of which the state and county each get one-half. Now there is a movement on foot to amend the law so as to increase the amount of this tax, and until the question is settled enrollments will probably not be so heavy. Those who are dissatisfied with the law say the state does not get enough out of the vessels, and otherwise follow out a sentiment that has been driving vessels from other states. They do not realize the importance to the great port of the state of having a tax rate which will not prohibit vessels from registering at Duluth. The prestige and advertising given a port by having its name painted on the sterns of so many vessels is of great value—more than could be obtained by any kind of just taxation.

The products of the flour mills at the head of the lakes last week was 71,130 barrels, a decrease of 10,000 from the previous week. This is probably due to the rising wheat market. Shipments from mill warehouses were 71,970, of which 24,360 were direct exports, and from rail warehouses 208,190, a large increase. Receipts by rail from interior ports were 142,200 barrels. Total stocks in hand are 160,270 barrels, of which 59,790 are at the mills and 100,480 at railroad docks.

All sorts of estimates have been made of the size of this year's wheat crop in Minneapolis and the Dakotas. But notwithstanding the serious situation in the Red River country, there are good grounds for believing that the crop will be larger than ever before. The movement of new wheat to date indicates that there is more wheat in the country than either last year or 1894. For the first ten days of September the receipts at Duluth and Minneapolis were as follows for the three years:

Year.	Duluth.	Minneapolis.	Total.
1884	1,781,000	1,842,500	3,623,500
1895	3,100,000	2,337,000	5,437,000
1896	3,515,000	1,890,000	5,405,000

In 1894 the total crop was in the neighborhood of 120,000,000, and while there is a good deal of old wheat included in the above figures, there is nothing like the difference between the figures for 1894 and '96. Tight money will allow of less holding of wheat, farmers and country elevators alike being forced to realize as soon as possible. With an improved demand abroad, shipments for the next three months should be very active.

BUFFALO.

THE CUT RATE ELEVATOR BUSINESS BOOMING—COAL SHIPMENTS MAKING A GOOD SHOWING.

Special Correspondence to The Marine Record.

BUFFALO, Sept. 15, 1896.

There is not much to be said in the way of general port movements that has not been said before, which means that business is steadily good here. The grain receipts are not quite up to the big average of recent weeks, but the flour is considerably above it, and though the brokers are despondent when they come to take care of the fleet that is asking for coal, it remains a fact that shipments are heavy. The custom house summary for the week past is an even 100,000 tons. I was inclined a while ago to think that the custom house

figures were too large, but I have access to actual shipments, and the last weekly summary was very close to 100,000 net tons, so that any notion that this port is falling off in its coal shipments is at present mistaken.

The big Duluth wheat fleet is already beginning to tell on receipts and has helped out Chicago already. Next week it ought to go it alone fairly. The Black Rock elevator is reaping the harvest this summer, for though it is handling grain at a cut rate, the report is that it will net \$30,000 profit this season. Stories are stories of course, but it is no story merely that parties are negotiating for a second old flour mill at the Rock to turn into an elevator for next season. The Raymond, too, popularly known as the grasshopper, is active. It had both the Globe and the Vance consigned to it last week and some of the dockmen thought it had bitten off more than it could chew, but it had them both out in good time. This too, is a cut-rate transfer.

There was no difficulty in getting men to work on the docks or anywhere during labor day, for though most of the docks have done well by the men, it seems to be the notion that they are not getting much laid up for winter and they do not feel like laying off a day if there is work. It is the falling off in lumber receipts that has told against the men, especially as ordinary lumber yard work has been scarcer than for several years before.

There was a sight in the inner harbor on Monday morning that ought to have warmed the blood of every ore carrier with his boat all laid up. Every active elevator, so far as could be learned, had a big grain cargo waiting for it and some had more than one, while at least one big steamer had no elevator at all. The list numbered about twenty, in which the Minnesota fleet was conspicuous. There were the Marcia, Masaba, Manola, Maritana, world without end, or rather dreary monotony without end, and also the Ogelbay, here for the first time, besides a lot of well known freighters, none of them small and most of them capable of carrying 100,000 bushels and presumably loaded with that amount.

The new Union liner Ramapo is not to get away from Chicago for some days yet, though there was some effort to despatch her last Saturday night. Capt. Robinson has been transferred to her from the Chemung and Capt. Huyck goes from the Jewett to the Chemung. Capt. Frowley, mate of the New York, will sail the Jewett.

CHAMBERLIN.

CLEVELAND.

NEGOTIATIONS FOR PROPERTY FOR RIVER WIDENING COMING OUT SATISFACTORILY—A UNION IRON WORKS REPRESENTATIVE'S VISIT.

CLEVELAND, Sept. 16.

Mr. Dickey, a brother of Gen. Manager Dickey, of the Union Iron Works, San Francisco, visited Cleveland last week, and was a witness of the launch of the revenue cutter Gresham, at the Globe shipyard. Mr. Dickey met a number of shipping and shipbuilding people here, and was much gratified to find such fine facilities and work on the Great Lakes. He is on his way to Europe and will visit friends in Scotland.

Ensign W. C. Cole, of the Branch Hydrographic Office, was detached from duty last Tuesday, but secured a few days leave, and will not get away from Cleveland until Friday or Saturday. His orders have been changed and he will now go to the dispatch boat Dolphin, stationed at New York. While the duties may not be so attractive as those on board a man-of-war, Mr. Cole will have opportunities to get ashore more frequently. He takes the place on the Dolphin of Lieut. C. B. Morgan, who is ordered to the Raleigh. Mr. Cole will be succeeded in charge of the Branch Hydrographic Office by Lieut. G. H. Stafford, who begins his duties October 10. The office will meanwhile be in charge of Mr. Graves, who has for some time been Mr. Cole's assistant.

Chaplain J. D. Jones last Sunday conducted the funeral services of a sailor who died at the hospital here last week. The gospel boat was draped in mourning and did duty as a hearse. The ceremony was very affecting.

It is announced that the negotiations looking to the acquisition of the property necessary for the widening of the river, is progressing satisfactorily. It is to be hoped that everything will be ready for actual operations to begin early in the spring.

Receipts of ore in the Cleveland district during August, according to custom house reports, were 888,171 tons, as compared with 1,121,988 tons in July, a decrease of 233,817 tons. The receipts by ports were as follows: Cleveland, 324,725; Ashtabula, 321,339; Fairport, 146,249; Conneaut, 51,636; Lorain, 14,222. The coal shipments were: Cleveland, 116,580 tons; Ashtabula, 100,796 tons; Fairport, 37,250 tons; Conneaut, 29,021 tons; Lorain, 12,789.

We are in receipt of the initial number of the Syren, a new weekly journal of shipping devoted exclusively to business information. The Syren is an attractive magazine, and is edited by Mr. Joseph L. Carozzi, who has for two and a half years been editor of that successful monthly, Shipping. He will continue to look after the latter publication, in addition to his new duties.

THE U. S. S. OREGON.

HER DESCRIPTION AND AN ACCOUNT OF HER OFFICIAL TRIAL.*

The U. S. S. Oregon, a sister ship to the Indiana and Massachusetts, is a twin-screw, armored, coast-line battleship of 10,250 tons displacement at a mean draft of 24 feet, and was built by the Union Iron Works, of San Francisco. The contract was signed November 19, 1890, and the vessel was to be completed in three years. The contract price, exclusive of armor, was \$3,180,000. Before work was begun, however, it was decided to increase the length of the ship from 344 to 348 feet, at an additional cost of \$42,810, making the contract price \$3,222,810.

The first keel plate was laid November 19, 1891; the first frame was raised exactly a month later. The launch took place October 26, 1893. On May 14, 1896, the Oregon was given her official speed trial in Santa Barbara Channel. Her average speed for the four hours was 16.791 knots, thus breaking the record of the Indiana and Massachusetts by 1.254 and .5831 knots respectively. The guaranteed speed was 15 knots, to be maintained for four consecutive hours under forced draught, with an air pressure of not to exceed one inch, at a mean draft of 24 feet. It was further agreed that for every quarter knot above the guaranteed speed the contractors were to receive a bonus of \$25,000.

The hull dimensions of the Oregon are as follows: Length between perpendiculars on load water line, 348 feet 1 1/4 inches; over all, 351 feet 2 inches; beam, extreme, and at load water line, 69 feet 3 inches; ratio of length to beam, 5; depth of hold from main deck beams to top of floors, 32 feet 1 inch; height of superstructure above main deck beams, 7 feet 4 inches; draft, seagoing, mean, 26 feet 8.98 inches; displacement, seagoing trim, 11,718.96 tons; displacement per inch at load water line, 42.84 tons; center of buoyancy above bottom of keel, 14.68 feet; center of gravity above bottom of keel, 24.4853 feet; transverse metacenter above center of buoyancy, 28.175 feet; longitudinal metacenter of buoyancy, 337.32 feet; metacentric height above center, transverse, 3.6897 feet; metacentric height, longitudinal, 352 feet; coefficient of fineness, block, .621; co-efficient of fineness, load water line, .748; prismatic coefficient, .668; number of frames, 91; water-tight compartments, 249, of which 45 are in the double bottom; wetted surface, 29,890 square feet.

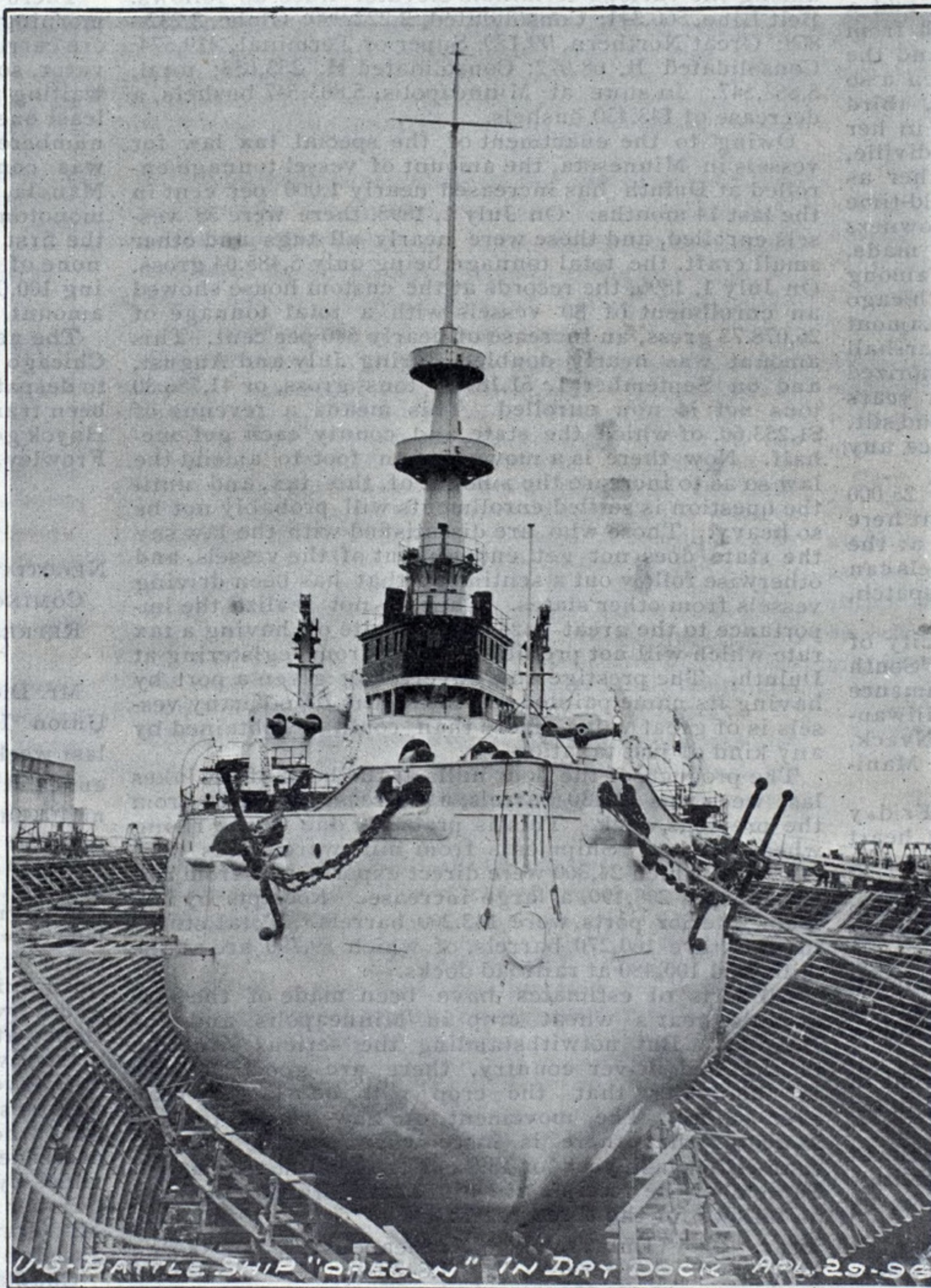
The material used in hull construction is mild steel of domestic manufacture. The outer keel is of 30, the inner keel is of 25, and the vertical keel of 20-pound plates. The double bottom extends a distance of 196 feet, and is 3 feet 3 inches high amidships. Throughout the double bottom the frames are 4 feet centers, and forward and abaft the double bottom 3 feet 6 inches apart. The forward hold is taken up by trimming tanks chain lockers, shell rooms and magazines. Amidships are the boilers, engines, coal bunkers, and hydraulic pumps for the turrets. In the after hold are trimming tanks, ammunition rooms, places for engineer's stores, etc. On the forward and after platforms are shell rooms, torpedo machinery, store-rooms, and steering gear.

The side-armor is of Harveyized nickel steel, 18 inches thick from the top to 12 inches below the water line, tapering thence to a thickness of 8 inches at its abutment with the armor shelf. It extends over a length of 149 feet, affording protection to machinery and boilers. From the ends of the side-armor, a diagonal armor of nicked steel, 14 inches thick, extends to the forward and after sides of the 13-inch barbettes, and forms the ends of the citadel. The latter is covered with a nickel steel plate, 1 1/4 inches thick, backed by 2 1/2-inch plates. Forward and aft of the citadel, the armor deck is made up of two 1 1/2-inch nickel steel plates.

The casemate armor is also of nickel steel, 4 inches thick, and backed by 2 1/2-inch steel plates. The conning

tower is at the base of the military mast upon the superstructure deck. All openings in the armor deck over the machinery and boilers are protected by armor bar gratings.

There are two triple-expansion engines of the inverted, direct-acting type, placed side by side in separate water-tight compartments. The cylinders of each are 34 1/2, 48 and 75 by 42 inches. The common diameter of the piston valves is 17 inches. The piston rods are 7 1/2 inches in diameter, 5 feet 5 1/2 inches long, from collar to shoulder, and 8 feet 3 inches long over all; the connecting rods are 7 feet long from center to center, the upper end having a diameter of 6 3/8, and the lower end of 8 1/2 inches. The crosshead pins have a diameter of 7 1/2 inches and a length of 9 inches. The crank-shafting has a diameter of 14 inches and the crank pins 15 inches diameter by 17 in length. The diameter of the thrust-shaft is 12 3/4 inches, and its length 19 feet 3 inches. The line shafting is 38 feet 3 inches long, with a diameter of 13 3/4 inches; the length of the propeller shafting is 38 feet 9 1/2 inches, with a diameter of 14



THE U. S. S. OREGON IN DRY-DOCK.

inches. The propellers are of the modified Griffith form, three-bladed, adjustable, with an axially expanding pitch. The material is manganese bronze. The diameter of the propeller is 15 feet, with 16 feet mean pitch. The pitch set on trial, however, was 15 feet 6 inches. The immersion of the propeller at 24 feet draft is 8.06 feet. For each main engine there is one double-vertical, single-acting, geared air pump, driven by a pair of simple engines. There is one centrifugal double-inlet circulating pump from each main engine, driven by a vertical, direct-acting, compound engine. It has a suction from the sea, main drain well, and from engine-room bilge.

There are four double-ended steel boilers of the horizontal fire-tube type, placed for-and-aft in four water-tight compartments, with a 'midship passageway extending throughout the boiler space. This passageway is divided into four compartments, and has water-tight doors leading into the fire-rooms, forward hydraulic pump room, and into an air lock, at the forward end of

the engine-rooms. Each boiler has eight corrugated furnaces and four combustion chambers. The tubes are of steel, and protected at inner ends from the flame by wrought iron rings let into the back tube sheets. Each boiler has three 4 1/2-inch safety-valves in a common case, and fitted so as to be worked from berth-deck or fire-rooms. The test pressure was 250 pounds, and the ordinary working pressure 160 pounds. The outside diameter of the boilers is 15 feet, and the length 18 feet. The inside diameter of furnaces is 3 feet, the total heating surface of grates being 276 square feet.

For the main boilers the closed fire-room system is used, the air being furnished by 8 Union Iron Works' centrifugal blowers. These are located one in each fire-room, and are driven by an inverted compound engine, enclosed in a dust-tight case. For the auxiliary boilers the closed ash-pit system is used; the air is supplied by one blower and engine of the same size and pattern as for the main boilers, and is passed through air ducts to housings around the furnace doors. Suitable valves are provided for admitting the air, both above and below the grates. There is also a blower for ventilating each engine-room.

The coal bunkers are 28 in number, with a total capacity of 1,594 tons, at a rate of 42 cubic feet per ton.

For operating the 13-inch guns and revolving their turrets there are two hydraulic plants, one just forward of the main boilers, and the other abaft the engines. Each plant consists of two vertical, differential plunger pumps, driven by steam cylinders fitted with Dow's valve gear, and combined pressure regulator and governor, an accumulator, water tank, and all necessary fittings. The pumps are arranged side by side, and deliver into a common discharge to the central column of their respective turrets and accumulators. Through the wing passage on the port side a 6-inch hydraulic pipe connects the pressure side of the forward and after pumps, while a 6-inch galvanized gas pipe passes through the wing passage on the starboard side, and connects the escape from the engines in the forward and after turrets, thus enabling either turret to be operated at will by either set of pumps. Each accumulator is fitted with an air compressor and air pressure chamber, all connected together and resting upon a common base. For supplying each plant with fresh water, a tank of 1,000 gallons capacity is fitted in each pump-room. The test pressure, hydraulic, is 1,200 pounds per square inch, and of air 300 pounds. The capacity of each pump is 525 gallons per minute. It makes 35.74 double strokes per minute. Details are given in the accompanying plate.

Following is a summary of the number of engines on the Oregon, the numerals expressing the number of steam and water cylinders: Two main engines, 6; two main air pumps, 4; two main circulating pumps, 4; two auxiliary air and circulating pumps, 2; two hot well pumps, 2; four fire and bilge pumps, 4; two water-service pumps, 2; two reversing engines, 2; two turning engines, 4; two hydraulic steering-gear pumps, 4; four hydraulic pumps for 13-inch turrets, 4; two ventilating blowers in engine-room, 4; four ventilating blowers on berth deck, 8; nine forced draft blowers, 18; four main feed pumps, main boilers, 4; four auxiliary feed pumps, main boilers, 4; one main feed pump, auxiliary boilers, 1; one auxiliary feed pump, auxiliary boilers, 1; three dynamo engines, 6; four ash-hoist engines, 8; one engineer's workshop-engine, 1; two evaporator and distiller pumps, 2; one fresh-water pump, 1; one sanitary pump, 1; four 8-inch turret engines, 8; two 13-inch turret engines, hydraulic, 6; one ice machine, 1; two air compressors for torpedo tubes, 4; one windlass, 2; five winches, 10; two boat cranes, 4; two propelling engines, steam cutter and launch, 4; two feed-pumps for same, 2; total, 84 engines, with 138 cylinders.

All marine publications for sale at the RECORD office.

*From a paper read before the American Society of Naval Engineers by Mr. Leo D. Morgan. We are indebted for the illustrations to the Journal of the Society.

CORRESPONDENCE.

We do not hold ourselves responsible in any way for the views or opinions expressed by our correspondents. It is our desire that all sides of any question affecting the interests or welfare of the lake marine should be fairly represented in THE MARINE RECORD.

NOT AN ORIGINAL IDEA.

To the Editor of The Marine Record:

In the American Shipbuilder of July 9 is an article on "Turret Steamers," saying: "The American Steel Barge Co. were originators of whaleback steamers, and that 'naval architects and shipbuilders of the United Kingdom took the hint and have produced vessels of the turret deck type.'" This deduction leads to an erroneous conclusion, and as a subscriber to your journal, I wish to be allowed to say that in the winter of 1879-80 I prepared plans for a whaleback schooner for the coal trade (which means coal outwards and grain homewards). These ships are deeply laden and have to endure terrific weather; their hatchways are so large that the deck is generally only a narrow gangway between the coamings and the bulkheads; it is therefore necessary to free them immediately from the sea they take on board. My boat had no deck erections beyond a central bridge-house and the long narrow hatchways in the center or at either side of the turtle back deck which ran from stem to stern.

SIR C. PURCELL TAYLOR, Bart.

No. 2 Powis Place, Queen Sq.,
London, W. C. Sept. 3, 1896.

BIDS ON THE BATTLESHIPS.

Bids were opened Monday by the Navy Department on the construction of three new battleships of the Kentucky type. The bids were very much lower than those on the Kentucky and Kearsarge, and no gold clause was inserted in any of the bids, which were as follows: John H. Dialogue & Sons, Camden, N. J., one battle ship, \$2,661,000; Bath, Me., Iron Works, one, \$2,680,000; Newport News, Va., Ship Building and Dry-Dock Co., one, \$2,595,000; Wm. Cramp & Sons' Ship and Engine Building Co., one or two, \$2,650,000 each; Union Iron Works, San Francisco, \$2,674,950.

The indications are that each of the last three bidders will receive a contract for one battleship, as the act of Congress provides that one of the three shall be constructed on the Pacific Coast if the bid of any firm out there is reasonably near the Eastern figures.

The close bidding was a most remarkable feature, and is undoubtedly due to present low prices for material and the small prospect for a large amount of merchant shipping during the coming year.

TORNADOES AND CYCLONES.

The tornado is a sudden outburst of wind in an otherwise quiet, sultry atmosphere; it is ushered in by a loud indescribable roar, similar to a continuous roll of thunder; its path is very narrow—seldom more than 500 feet wide at greatest destruction; it moves, generally from southwest to northeast, and rarely extends more than 20 miles; it very often rises in the air to descend again at a point a few miles ahead; it is often accompanied by thunder storms, with often a bright glow in the clouds; this cloud has usually a funnel shape, which appears to be whirling, though some observers have described its appearance like that of a huge ball rolling forward. A tornado may be considered as the result of an extreme development of the conditions which otherwise produce thunder storms.

A cyclone on the other hand, is a very broad storm, oftentimes 1000 miles in diameter, and sometimes can be followed half around the world. The winds circulate about it from right to left, or the way one turns clock hands backwards (in the southern hemisphere this is reversed.) The air pressure always falls as one approaches the centre, where, at sea there is a portentous

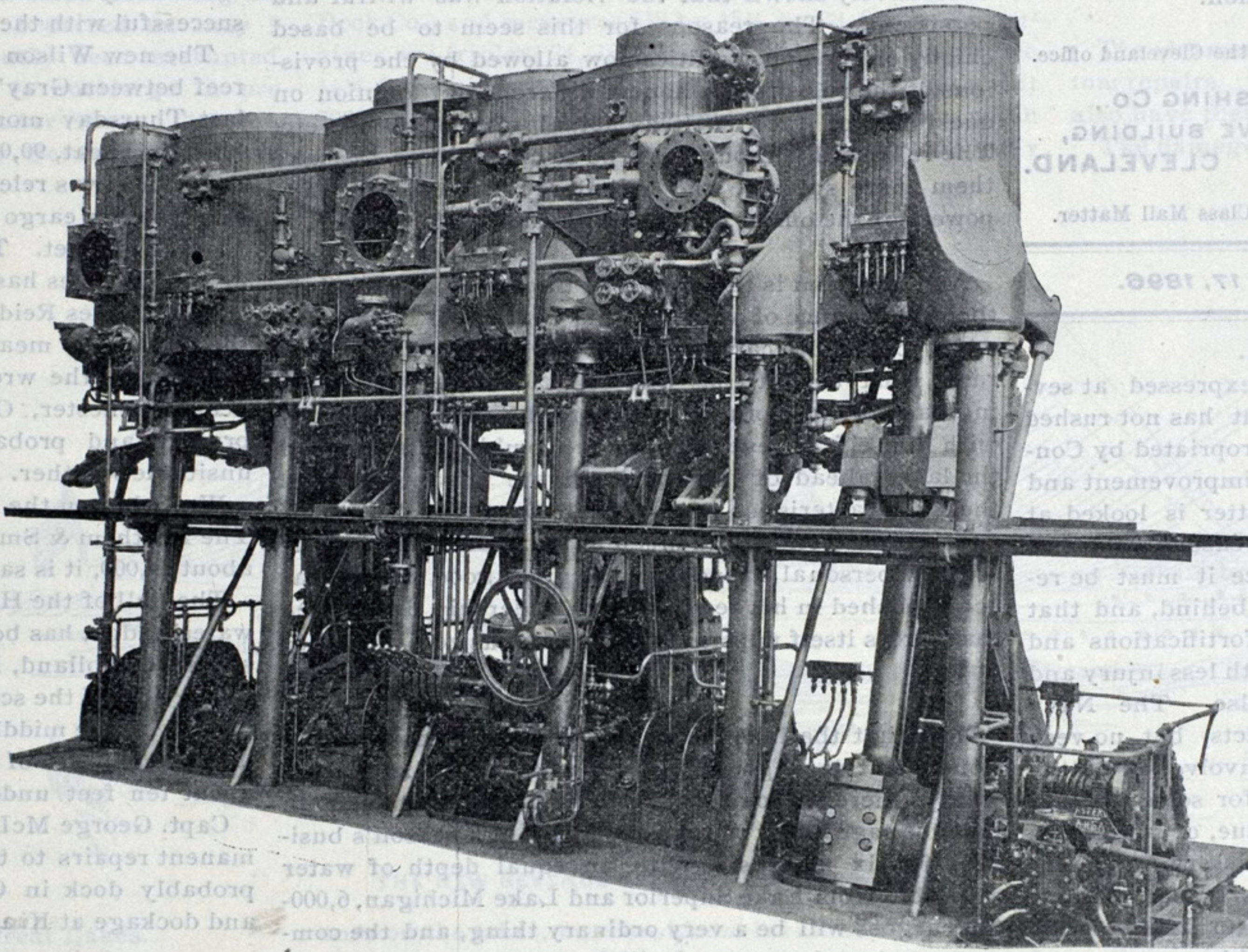
calm, with clear sky visible at times. The cyclone winds often rise to hurricane force, but are not to be compared with the extreme violence of the tornado, before which the most solid structures are razed.

The French word trombe or tourbillon describes almost exactly the tornado, which term was first applied to severe squalls, with funnel shaped clouds, experienced on the west coast of Africa, and which to this day inspire the utmost fear in the minds of the natives.

WILLIS L. MOORE,
Chief of Weather Bureau.

MANCHESTER CANAL ALL RIGHT.

Several attempts have been made to belittle the importance of inland waterways improvements as compared with railways. The alleged financial failure of the Manchester ship canal, has frequently been referred to in this connection. There has been great improvement in the service and increase in the tonnage employed, since its opening to regular traffic, January 1, 1896. The traffic for the first half year was 262,000 tons; this had increased in the last half year to 668,000 tons. Arrangements have been made for regular and frequent sailings of steamers from New Orleans and Galveston to Manchester. As a means of reducing freights, this canal has proved a signal success. The Canadian Gazette,



ENGINES OF THE OREGON.

London, Aug. 20, says that the Manchester ship canal authorities are making renewed efforts to secure a largely increased trade, via the canal, with the United States and Canada. The consumption of imported grain in the Manchester district is about 2,000,000 tons, or nearly 67,000,000 bushels per annum.

METHOD OF REMOVING BOILER SCALE.

A correspondent of the Practical Engineer describes a novel method of removing boiler scale as follows: "I have used turpentine on the scale with a sponge in the dark for fifteen minutes; then got out and applied a light, placed on the end of a 12-foot bar, keeping myself well out of the boiler for safety. I have done a day's work in half an hour. The instant heat of the turpentine shatters the scale immediately, and scarcely warms the boiler plate."

The American Economist gives the following summary in the United States during the first seven months of 1896: Lumber, \$9,200,000; woollens, \$4,600,000; machinery, \$3,500,000; iron, \$3,200,000; printing, \$2,700,000; clothing, \$2,500,000.

Wm. H. Webb, the great American shipbuilder and founder of Webb's Home and Academy for Shipbuilders at Fordham Heights, Harlem River, was born in New York, June 16, 1816.

COAST AND FOREIGN BUILDING.

The Columbian Iron Works, Baltimore, are making good headway in the building of the three torpedo boats and the Holland submarine boat for the United States Navy. Torpedo boat No. 3 will probably be launched this week. Two or three weeks later she will be followed into the water by torpedo boat No. 4 and shortly afterward torpedo boat No. 5 will be ready for launching. The machinery for all the boats is well advanced. That for No. 3 is completed and mostly placed aboard.

In the office of Chas. D. Mosher, 1 Broadway, New York, are the plans of a new vessel for the Cuban Secretary of War, General Carlo Roloff. This new craft will be Cuba's first fighting ship, and will be built at once, so rumor says. She will be named Maximo Gomez, and will be 100 feet long, 11 feet beam, 4 feet draught; of great speed and well armed. She will have the appearance of a steam pleasure yacht, but could be converted to a cruiser-destroyer in just three hours. She will be used chiefly as a blockade runner.

The Crescent Shipyard, Elizabethport, N. J., is to build a sidewheel steamer for Carthage, South America. Her dimensions will be 100 feet long, 22 feet beam and 7½ feet depth.

The Harlan & Hollingsworth Co., Wilmington, Del.

have laid the keel for a new ferry boat of the following dimensions: Length, 150 feet; width over guards, 52 feet, and 12 feet depth of hold. The boat will be a double-decker. The engines will be built by the Pusey & Jones Co. and will be of the beam type, with cylinders 36 inches in diameter and 9 feet stroke.

Herr Krupp, the iron king of Essen, has purchased the Germania shipbuilding works for 6,325,000 marks. The entire plant will be transferred to Herr Krupp on October 1, and the capacity for building ships will be increased considerably.

During August Scotch builders launched 25 vessels of 21,835 tons, against 20 vessels of 24,858 tons in July and 37,104 tons in August, 1895. For the year up to September 1, 248,715 tons have been launched, as compared with 248,071 tons for the corresponding period of last year, 232,414 tons in 1896, 101,066 tons in 1893, and 273,125 tons in 1894.

During August English builders launched 13 steamers, two torpedo-boat destroyers, one cruiser, and one schooner. Of this number four vessels, of 7,140 tons, were launched

from the Wear, against 11 vessels, of 25,231 tons, in July; and nine vessels from the Tyne, against nine in July. The Wear output for the year so far is 58 vessels of 147,859 tons, while 77 vessels have been launched from the Tyne.

THE NEW FRENCH LIGHT, RATIERE.

The new electric light for warships invented by a French naval officer is attracting great attention. It is called the "Ratiere," is placed in the stern, and can, it is said, be used for night signalling without being understood by the enemy. This hidden light has been tested with great success in the French Mediterranean Squadron. It is only manipulated by commanders of ships and sworn officers, and the apparatus when not in use is carefully locked up, so that only authorized persons can see it. There is a mysterious air about this invention; but after X rays we are prepared to believe almost anything.

JACKSONVILLE, FLA., January 27, 1896.

H. G. Trout, Buffalo:—The many propeller wheels I have bought from you for my different customers have always given splendid service, and are highly satisfactory to myself, as well as to the owners of the boats. I am much pleased with your wheels and also with the promptness with which you execute my orders. Yours truly, T. MURPHY, Jacksonville Machine & Iron Works.



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HERE AND THERE.

There is considerable indignation expressed at several ports because the War Department has not rushed the work of expending the money appropriated by Congress last spring for river and harbor improvement and breakwater construction. If the matter is looked at calmly and broadly, a good many reasons could be found for the delay. In the first place it must be remembered that revenues are very far behind, and that War Department expenditures, for fortifications and other public works, can be held back with less injury and fewer complications than anything else. The Navy Department proceeds with its contracts, but no very large immediate expenditure will be involved in battleship and torpedo boat construction for some time to come. Pensions must be paid when due, or severe distress would be wrought among many deserving among the poorer classes. But the public works can wait, at least in the eyes of administration, until the public pocketbook shall have been replenished by some means.

Then again, in all works other than dredging, very little progress is possible on improvements begun after the middle of the season. Fall weather is, at best, very uncertain, and if breakwaters and piers are not well advanced before the end of the season, all that has been done is likely to be carried away by the first big storm; and if it withstands the fall gales it is certain to be badly damaged, if not ruined, before spring, by the grinding and pressure of the ice. On the other hand, should contracts be let in the winter, the successful bidder can do much in the way of getting out timber and other material, so as to be ready to begin actual operations on the spot as soon as navigation opens.

Designs for crib and pier work are much more carefully prepared than they used to be, and while the office work performed by the engineer in charge and his assistants is thereby increased considerably, the result has been a great saving to the government. With the exact dimensions of every timber, and the exact quantities of spikes, bolts and rods given in the specifications, the contractor has an absolute certainty to work on as to the amount of material required, and is in consequence able to keep his margin to the lowest limits consistent with ordinary profits. He is also able to make a lower bid, for the reason that the specifications allow him to do much more of the work before going to the scene of the improvement, owing to the precise measures given in the specifications, and because, knowing these

measures, the contractor is able to buy his material more economically.

Substantially the same reasons account for the very reduced prices on battleships, as shown by the proposals opened a few days ago on the three new men-of-war authorized by Congress last winter, which are shown in detail on Page 7. The reduction is in part due to lower prices on material, and the introduction of labor-saving machinery. But another very telling reason is the fact that owing to the experience gained in constructing the present ships of the new navy, the builders are able to get closer to actual facts, and in consequence do less and less guessing as they figure on each succeeding contract. This is fast bringing the prices of American-built battleships down toward the cost of naval construction abroad, and as the results obtained are even better on the large classes of naval tonnage than have yet been reached abroad, the difference is not so great as it might seem when all points are not taken into consideration.

It seems now to be settled that the fines assessed for violation of the St. Mary's River rules will not be collected to the full extent except in cases where it shall be conclusively shown that the violation was wilful and persistent. The reasons for this seem to be based chiefly on the opportunities now allowed by the provisions of the rules for an honest difference of opinion on questions of fact, such as actual rate of speed, etc. The rules will without doubt be so amended as to make them more specific, and to enlarge the discretionary powers of the officer charged with their enforcement.

And on whom is the mantle of Capt. Mack to fall in the performance of work of this character? The man who successfully carries out the work which he inaugurated must be untiring and self-sacrificing, not holding back because others will share the benefits equally with himself, but ever placing the combined interests of the lakes ahead of his own private advantage. All these characteristics were seen in Capt. Mack in their greatest perfection, and much as he is mourned on the score of personal friendship, the great good that he has accomplished in his few years of leadership is the idea that forces itself uppermost, and emphasizes the sense of loss.

Now that the lake levels are on the rise, and indications point to a good depth of water for next season, what is there to look forward to? There is now enough lake tonnage afloat to take good care of a season's business in six months. With an equal depth of water available from Lake Superior and Lake Michigan, 6,000-ton cargoes will be a very ordinary thing, and the commerce to be taken care of will have to grow enormously to cause demand enough to keep rates on a profitable basis for any but the largest class of tonnage. It has always been true in the past that recovery from periods of depression has been very slow, and while the reaction ought to be quicker during the coming year, because trade is held back chiefly by uncertainties regarding the future, yet there will be little to look forward to in the shape of high rates next season.

Speaking of a reduction in the margin of profit, the Detroit Free Press lately contained a half-column article regarding reduced prices for dredging, as compared with what was paid a few years since. It was pointed out that this was due to keen competition, and the fact that the machinery for doing the work has been vastly improved. The article reminds us of a conversation which recently took place in a United States Engineer's office between two unsuccessful bidders on a dredging contract. The bidders were not far apart in their estimates, but one bid was a fraction under 10 cents per cubic yard, and the acceptance of this was recommended. One of the above gentlemen remarked to his fellow that there was not much profit in dredging at that price. "Much!" retorted the other, who has in his days seen some "soft snaps" in dredging contracts; "Much! why it wouldn't be much if it were all profit!" That, by the way, certainly expresses the situation in wild freights.

A good many items are circulating in the daily press because of a shipment of pig iron from Elk Rapids,

Mich., to England. This is rather remarkable, because the bulk of the product of the Elk Rapids furnaces have been going to England for several years. England manufactures no charcoal pig, and was formerly dependent for her supply upon Sweden and Norway. An experimental lot was ordered from the Elk Rapids furnaces a few years ago, and the result was so satisfactory that it finds a ready market. The route has been changed a little, as the iron goes via Baltimore, instead of by New York, as formerly.

WRECKS AND WRECKING.

The D. & C. steamer City of Mackinac collided with and sunk the coal laden schooner William Crosthwaite, in tow of the Street, in Lake St. Clair, just outside the canal, at 1 o'clock Sunday morning. The accident was caused by the Mackinac backing aground and breaking her rudder while trying to keep out of the way of the tow. She was bound up. The Crosthwaite struck the stranded Mackinac on the bluff of the starboard bow, doing the steamer no hurt, but tearing in her own bows sufficiently to settle her on the bottom in 14 feet of water, her decks remaining out. The Mackinac returned to Detroit and shipped a spare rudder, losing a day. The Crosthwaite was raised and taken to Detroit Wednesday morning by Capt. H. W. Baker, who was so successful with the Oceanica.

The new Wilson Line steamer W. D. Rees ran on a reef between Gray's reef and Hog Island at 7 o'clock last Thursday morning. She was loaded with 58,000 bushels wheat, 90,000 bushels corn, and 100,000 bushels oats. She was released after being on some little time, and took her cargo to Buffalo, where 1,150 bushels was found to be wet. This indicates a heavy bottom damage. The Rees has come to Cleveland to go into dock.

Capt. James Reid is reported as having begun to raise the Cayuga by means of his pontoons.

Work on the wrecked schooner George W. Adams, near Colehester, Ont., has been abandoned for the present and probably for the season, because of unsuitable weather.

Wrecking on the Mattie C. Bell has been given up. The Leatham & Smith Towing and Wrecking Co. spent about \$4,000, it is said, in trying to release her.

The hull of the Harvey Watson, which burned to the water's edge, has been raised and towed to Anderson's shipyard, Holland, Mich., where she will be rebuilt.

The hull of the schooner Col. Ellsworth Transit, lies directly in the middle of the channel above the Straits, 4 miles northeast of Wangoshance light. The deck is about ten feet under water, with three masts showing.

Capt. George McLeod estimates the cost of the permanent repairs to the Montegale at \$12,000. She will probably dock in Cleveland. Her temporary repairs and dockage at Kingston cost \$300.

FLOTSAM AND JETSAM.

The laying up movement continues.

The Ann Arbor ferry boats will probably not run later than January 1.

Capt. N. Gifford, of the schooner Ahira Cobb, has been sailing for fifty-seven years.

The yacht Canada was sold at auction, Tuesday, at Toronto, to Senator Sanford, of Hamilton, Ont., for \$3,250.

Capt. E. B. McQueen, of the steamer Senator, fell in to the hold, and was badly hurt. He will go to his home in St. Clair.

John Miller, a sailor on the steamer Topeka, fell into a hatchway on the boat at Chicago. He died while on the way to the hospital.

The lowest bid on building South Bass Island lighthouse station was \$6,595. Col. J. A. Smith will buy material and build it by day work.

The steamer Queen City took 157,000 bushels of wheat out of Duluth last Friday night on a mean draft of 14 feet 8 inches. The cargo is equal to 4,710 net tons.

The steamer E. W. Oglebay lately made the run from Fort Gratiot to Detroit in 13 hours and 29 minutes, reducing the record of the Centurion between the same points by 21 minutes.

Mashek & Hanson, owners of the schooner Richard Mott, have recently received from the city of Chicago \$2,275, principal and interest, in payment of damage to the schooner received by collision with a swinging bridge in 1893.

SHIP BUILDING AND REPAIRS.

A LITTLE NEW TONNAGE.

While builders have no hope of securing orders for as much new tonnage as has left their yards during the past twelvemonth, yet a few new boats will be built during the coming winter. One shipbuilding company is making drawings and estimates on a bulk freighter of a radically new type, and the directors of the Cleveland & Buffalo Transit Co. have instructed General Manager Newman to secure bids on a sister ship to the City of Buffalo. These, with the new passenger steamer which the Goodrich Transportation Co. will build, the whale-back steamer and barge which are almost certain to be constructed on builders' account by the American Steel Barge Co., and the steamship which the Cleveland Ship Building Co. will soon begin, to the order of the Wilson Co., form the nucleus of a very fair sized fleet for 1897.

F. W. Wheeler & Co. West Bay City, expect to launch the big Rockefeller steamship George Stephenson next Saturday, Sept. 19, although a postponement may be necessary. The following Saturday, Sept. 26, is the date set for the launch of the steamer, James Watt, of the same fleet, by the Cleveland Ship Building Co. The latter is a commendably rapid piece of work. The keel for the Watt was laid the week following the launch of the Queen City, which occurred on May 9. The work has, moreover, frequently been interrupted, and the number of working days is not large in proportion to the four months calendar time. The contract required her completion by October 1, and she will come out not very far behind that date.

LAUNCHES OF THE WEEK.

WALTER Q. GRESHAM.—The most notable launch of the past week has been that of the revenue cutter Gresham, building at the Globe Iron Works Co.'s yard, Cleveland, to the order of the United States Government. The launch occurred at 2:20 o'clock last Saturday afternoon, and was witnessed by a large concourse of people. Miss Ruth, daughter of M. A. Hanna, performed the christening ceremony. The Gresham is as handsome as a government boat is usually allowed to be, and in detail of building is remarkably fine. Her plating is said to be the handsomest work of its kind ever accomplished on the Great Lakes.

The Gresham is 205 feet over all, and 188 feet on the water-line, by 32 feet beam and 16 feet molded depth. Her displacement at mean draft of 10 feet 10 inches will be about 900 tons. She is expected to maintain an average speed of 16 knots when the engine is developing 2,000 horse-power. The engines are triplex, 25, 37½ and 56½ by 30 inches. The high pressure cylinder is fitted with a piston valve, and the intermediate and low pressure with a double-ported slide valve, all operated by the Stephenson link motion, with double-bar links. The crank and propeller shafts are of forged, mild open-hearth steel, made by the Bethlehem Iron Co., as are also the pistons and connecting-rods and the front columns.

Steam is supplied by four single-ended Scotch-type boilers, each 11½ by 10 feet. Each boiler has two corrugated furnaces, the total grate surface being 182 square feet. The total heating surface is 5,300 square feet. There is a surface condenser with about 3,000 square feet of cooling surface; there is also a pair of vertical independent, single-acting pumps, operated by one steam cylinder. The main and auxiliary pumps are of the vertical duplex type.

The propeller is of manganese bronze, 13 feet in diameter, and is expected to give about 16½ knots maximum speed. The coal bunkers will hold fuel for a 2,500-knot cruise at full speed, and 4,000 knots at a 10-knot speed.

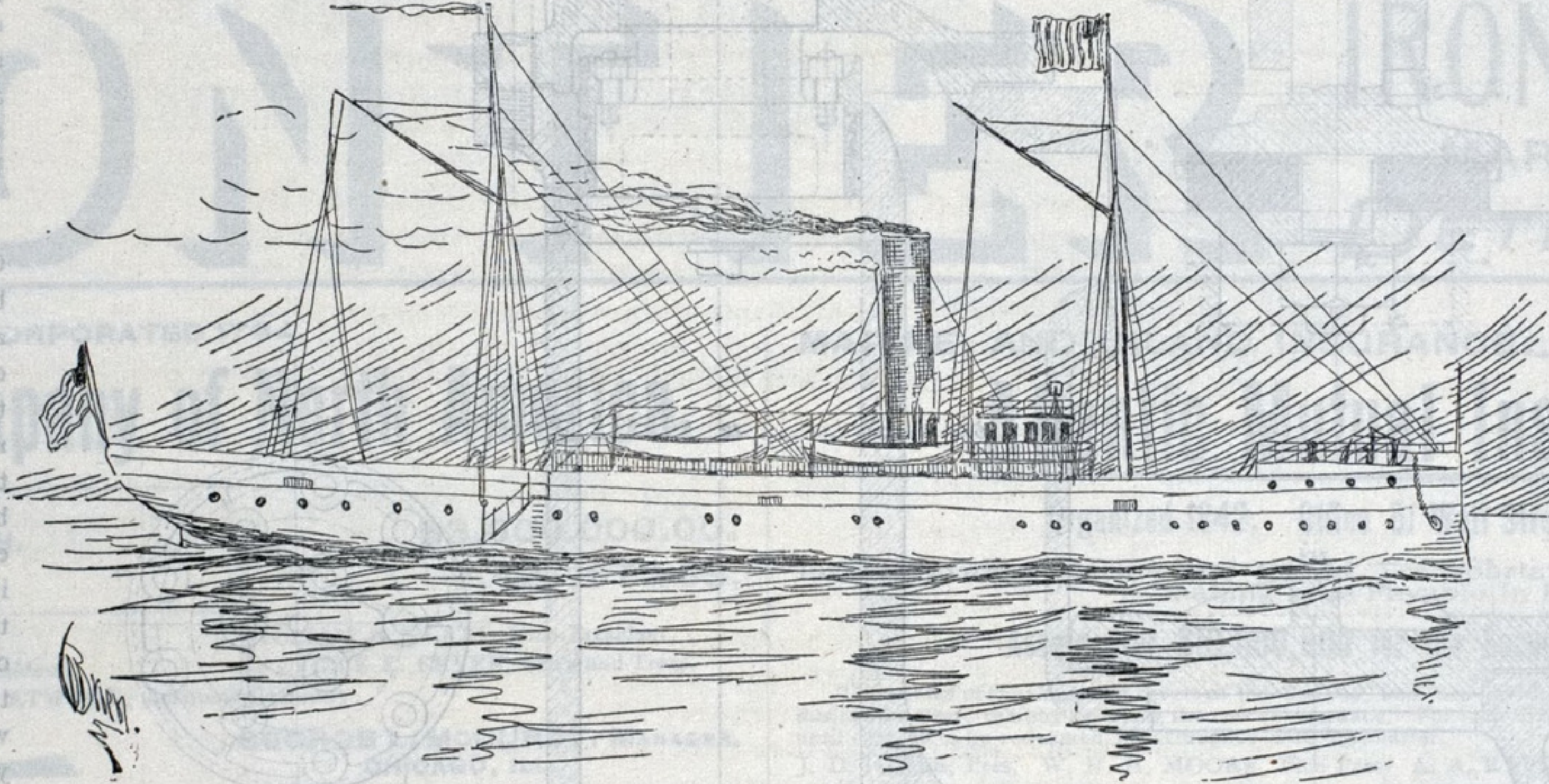
The cabins and officers' quarters are in the after part of the cutter, and the crew are quartered forward. A steel deck-house contains the carpenters' and engineers'

shop, armory, galley, executive officers' headquarters, etc., and at the forward end is the pilot-house and chart-room. An electric light plant of 100 amperes capacity at a pressure of 80 volts will be located in the engine-room, and will supply light for general purposes and a current for a search-light, which is located on top of the pilot-house. The usual steam capstans, windlasses and steering gear are furnished.

The new boat is schooner rigged, with considerable spread of canvas. In her stem is a fixed torpedo tube, and the after ports will accommodate swivel torpedo tubes. The gun mounts are designed for the emplacement of 4-inch rapid-fire guns, in addition to an auxiliary battery of 6-pounder Hotchkiss rapid-fire guns. The 4-inch guns throw a projectile weighing thirty pounds to a distance of about four miles, and at the rate of about twelve shots per minute.

The crew of the Gresham, in time of peace, will number about seventy-five. The bid on the vessel was \$147,800 on the department plans, and \$142,750 on amended machinery plans.

ROBERT FULTON.—Another mammoth steamship of the Rockefeller fleet was launched into Detroit River, at Wyandotte, last Thursday, shortly before noon. The Fulton is a sister ship of the Sir William Fairbairn, recently built at the same yard by the Detroit Dry-Dock Co., and measures 438 by 45½ by 28 feet. Her engines are triplex, 24, 38 and 64 by 42 inches, with two 14½-foot boilers. The launch was witnessed by about 2000 people. Like the Fairbairn she will have a perch for a lookout on the foremast, these being the only



THE NEW REVENUE STEAMER W. Q. GRESHAM.

ones on the lakes, but considered invaluable in case of low-lying fog. The Fulton was taken to the foot of Orleans street, Detroit, to receive her machinery and fittings. In the afternoon representatives of the Bessemer Steamship Co., Mr. Sinclair Stuart, of New York, Manager of the United States Standard Register, and other invited guests went on the trial trip of the Fairbairn, which proved very successful.

ALFRED KRUPP.—The large steel barge Alfred Krupp was successfully launched at Chicago Shipbuilding Co.'s shipyard last Saturday afternoon at 3 o'clock, under the able directions of W. I. Babcock, manager of the shipyard. Miss Alice Pritchard Moore, of New Orleans, did the honors of christening the new vessel. The dimensions of the Krupp are 352 feet keel, 370 feet over all, 44 feet beam, 26 feet modeled depth. She is the second of the Bessemer Steamship Co.'s fleet launched on the Calumet, the first being the George H. Corliss which entered the water two weeks before the Krupp.

GENERAL REPAIR WORK.

CLEVELAND.—The steamer W. D. Rees arrived Wednesday, and went into the Ship Owners' dock. Capt. Cyrus Sinclair, of Chicago, is looking after her. Thirteen of her bottom plates must be removed. During the week the Sauber and tug Cascade, of Lorain, had stern bearings repaired. The Frank Rockefeller got a new wheel, and the Nyanza got a new forefoot and piece of new keel. The Chisholm got out of the Cleveland dock Tuesday.

BUFFALO.—The St. Louis was taken to the Mills dry-

dock Tuesday. She will remain a steamer. The survey calls for the expenditure of \$7,500, but the owners say it will cost \$10,000 to \$12,000 to rebuild her, and will fight the case out on dry-dock bills.

CHICAGO.—At the Miller Bros.' shipyard, the steamer S. K. Martin is in dock and has received considerable re-fastening, has been re-calked from keel to deck, and has received a new upper deck forward, a new stern pipe, new wheel, and general repairs, and a new coat of paint. The steamer M. F. Butters is in for a new shoe by Donaldson Bros., shipsmiths. The barge Montgomery was in dock to have a leak stopped.

At the Independent Tug Line's dry-dock the tug A. B. Ward was in for repairs to stern bearings. The tug W. H. Wolf is in for general repairs and some calking.

TOLEDO.—The Craig Ship Building Co. has completed the repairs to the Ann Arbor No. 1. All the machinery forward, including the forward wheel, has been taken out, and the boiler has been moved aft and connected with the other two. This company docked, last week, the steamer J. H. Shrigley, putting a heavy steel arch in her, calking her, and making other needed repairs. They unshipped and repaired the J. J. Barlum's rudder, put some small repairs on the Cadillac, and partially re-decked the F. W. Fletcher, besides calking her thoroughly all over.

REPAIR NOTES.

The steamer Wawatam is in dock at Detroit for bottom repairs. The Oceanica and Wm. Crosthwaite will also have their damages repaired there.

The damage to the H. H. Brown, by striking in the Sault, is more than at first supposed. She is in dock at West Superior.

THE FREIGHT SITUATION.

The Chicago-Buffalo corn rate has dropped off to 1½¢, the demand for capacity being light at that figure. The Duluth wheat rate remains at 2½¢, but business is very dull. Coal shipments are falling off, the lighter shipments to Lake Michigan being due to tight money, and those to Lake Superior to the fact that previous months have made a very heavy showing. Lumber rates are little talked of. Toledo is shipping some wheat to Buffalo at 1¼¢.

An English syndicate has purchased for \$3,000,000 the franchise of the Erie Canal Traction Co. to wire the canal and operate the boats by trolley system. They expect to have the entire distance equipped in a very short time. The Cleveland Steel Canalboat Co. is so situated as to be able to take the first advantage of this new system, and an increase of canal boat traffic on Lake Erie will follow.

VISIBLE SUPPLY OF GRAIN.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY. Bushels.
Albany.....		25,000	75,000		
Baltimore.....	1,341,000	1,371,000	195,000	78,000	
Boston.....	1,085,000	490,000	202,000		
Buffalo.....	1,392,000	380,000	174,000	80,000	291,000
Chicago.....	13,188,000	4,366,000	1,703,000	380,000	55,000
Cincinnati.....	8,000	2,000	15,000	4,000	14,000
Detroit.....	466,000	14,000	33,000	26,000	
Duluth and Superior.....	5,864,000	12,000	211,000	249,000	159,000
Indianapolis.....	363,000	52,000			
Kansas City.....	550,000	23,000	57,000	5,000	
Milwaukee.....	396,000	3,000		122,000	57,000
Minneapolis.....	11,329,000	11,000	165,000	4,000	11,000
Montreal.....	337,000	58,000	177,000	6,000	25,000
New York.....	3,251,000	2,192,000	1,826,000	63,000	87,000
Oswego.....	123,000	125,000	59,000	100,000	
Peoria.....	27,000	40,000			31,000
Philadelphia.....	189,000	66,000	445,000	18,000	3,000
St. Louis.....	577,000	335,000	168,000		
Toledo.....	3,231,000	731,000	192,000	19,000	
Toronto.....	717,000	52,000	345,000	83,000	
On Canal.....	130,000		65,000		23,000
On Lakes.....	544,000	91,000	517,000	501,000	162,000
On Mississippi.....	2,426,000	2,456,000	1,443,000	59,000	234,000
Grand Total.....	47,602,000	13,007,000	8,078,000	1,777,000	1,152,000
Corresponding date 1895.....	38,092,000	4,934,000	2,841,000	585,000	487,000

CANADA'S LUMBER TRADE.

The Year Book for 1895 shows that the United States imported from Canada during 1894 pine logs valued at \$2,359,951, and in 1895, valued at \$1,860,725. These logs would produce a larger quantity of sawed lumber than is imported into the United States from Canada in the shape of boards, planks and deals. The Manufacturer has shown, time and time again, that the United States is dependent upon Canada for part of its supply of lumber, that without this supply it would be unable to maintain its extensive export in this article to West Indies, South America, etc. In this connection, Mr. E. L. Baker, United States consul at Buenos Ayres, in his report to the Government in Washington, dated December 29, 1894, put the value of pine lumber imported into Argentine from the United States in 1893, \$3,394,677. This, he says, is incorrect, as it is well known that nearly all the white pine comes from Canada, via Portland, Boston, etc. There is no good reason why the above quantity of logs should not be cut at Canadian mills and transported to the frontier of the United States by Canadian vessels and railroads. If so, the money spent in Canada would amount to six million dollars instead of two millions, and additional employment would be furnished for about ten thousand men in every year. Party papers whine over the alleged exodus from Canada. An export duty on pine logs would greatly aid in keeping our people here: but they refuse to support this common sense, practical policy, because it is at variance with their pet theory of non-intervention with the movements of trade.

Our pulpwood industry has increased amazingly in last few years. In 1881, the capital invested was \$92,000; in 1891, \$2,900,907; wages paid in 1881, \$15,720; in 1891, \$292,000; product in 1881, \$63,300; in 1891, \$1,057,810. Our exports of wood pulp in 1895 amounted to \$590,874, and of wood for pulp \$468,009. Our exports are chiefly to the United States. Besides supplying the paper mills of that country with the raw material for paper for its own use, Canada's exports of pulpwood enable our neighbors to export paper to the value of \$2,713,875. With abundant supply of water and water power, unlimited supply of suitable wood, and cheap labor, it is evidently sound policy on the part of Canada to impose an export duty on all pulpwood exported to any country which imposes a custom duty on Canadian pulp. That this policy is the correct one is evidenced by the very general anticipation on the part of the paper journals in the United States that it will soon be in force.—Canadian Manufacturer.

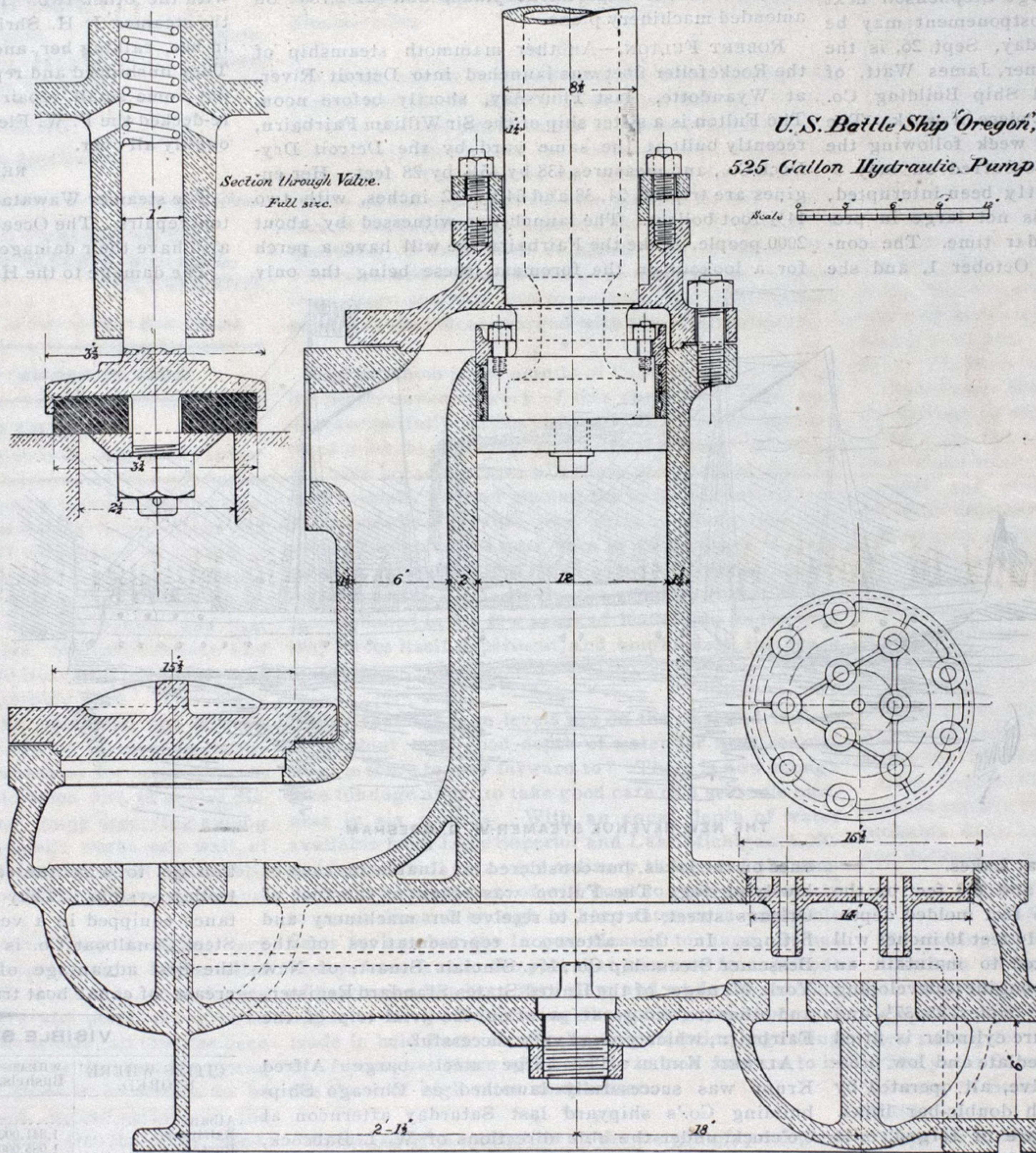
REGULATIONS FOR NAPHTHA LAUNCHES.

In 1890 two bills to bring naphtha launches under the regulations governing steam craft were introduced in Congress, and after careful examination by the committee to whom the bills were referred, they were reported on adversely. The matter was again agitated in 1894 and 1895, resulting as before, the legislation proposed being considered as wholly uncalled for, unnecessary and unjust, the extreme simplicity of the motor and its ease of management showing the absurdity of such restrictions.

This should apparently have definitely settled the question of inspection and license for naphtha launches; but the matter is again being agitated this year. One bill bearing on the subject has been offered, and will, we trust, become a law, as it undoubtedly ac-

complishes all that is necessary in the way of legislation and would probably stop agitation. One thing seems certain that experience has sufficiently demonstrated the safety of the system, and established a reputation so wide that no serious interference with their use by pleasure seekers will ever be tolerated.

The text of the bill alluded to provides "that all vessels above 15 tons burden carrying freight or passengers for hire, propelled by gas, fuel, naphtha, or electric motors, shall be and are hereby made subject to all the provisions of Section 4426 of the Revised Statutes of the United States, relating to the inspection of hulls and boilers and requiring engineers and pilots, and all vessels so propelled, without regard to tonnage or use, shall be subjected to the provisions of Section 4412 of the Revised Statutes, relating to the regulation of steam vessels in passing each other; and to so much of Sections 4233 and 4234 of the Revised Statutes, relating to lights, fog signals, and steam and sailing rules as the Board of Supervising Inspectors shall, by their regulations,



U. S. Battle Ship 'Oregon'.

525 Gallon Hydraulic Pump.

Scale 1" = 6"

deem applicable and practical for their safe navigation.—Gas Engine and Power Co.'s New Catalogue.

CHIEF STEWARD FOR THE GOODRICH LINE.

Mr. A. J. McCarthy has been appointed chief steward of this fleet, with such duties as the position calls for. He will have entire supervision of the steward's department and will see that stores are properly taken care of, and that the table service is all that it should be in every vessel of the fleet. Mr. McCarthy is the gentleman who took first prize for efficiency in the steward's department while sailing last season.

Taken altogether Beeson's Marine Directory is an improvement over all previous issues and should be in the possession of anyone whose interests are in any way connected with lake navigation. It is full of information which makes it almost invaluable to vesselmen and masters.—Milwaukee Wisconsin. For sale at MARINE RECORD office, \$5.

A TRAVELING SALESMAN ON PAPER.

Some weeks ago THE RECORD announced the consolidation of two of the best known yacht and launch-building concerns in the East—the Gas Engine and Power Co., of Morris Heights, New York City, and Charles L. Seabury & Co., of Nyack, N. Y. The consolidation arrangements having been entirely completed, the new company, which retains the name of Gas Engine and Power Co., has issued a most comprehensive catalogue of yachts and smaller boats, and the power furnished therefor. The book is most complete, and answers thoroughly all questions likely to arise in the minds of those who shall contemplate putting money into a yacht or launch. We have frequently received, during the past few years, letters from parties wishing to know more about naphtha launches, their cost, mode of running, regulations of operation, etc. All these questions are fully answered in the new catalogue, which also contains finished views, deck plans, and specifications for the various sizes of boats. Another valuable feature is a list of yacht and launch owners of the United States, showing the names of several hundred residents of the Great Lakes region who own boats turned out by these companies. The list can readily be taken as one of reference, in case information as to the success of the craft is wanted. In short, the book performs practically all the duties that a salesman traveling in the interest of the company could do, and must bring about good results to the Gas Engine and Power Co.

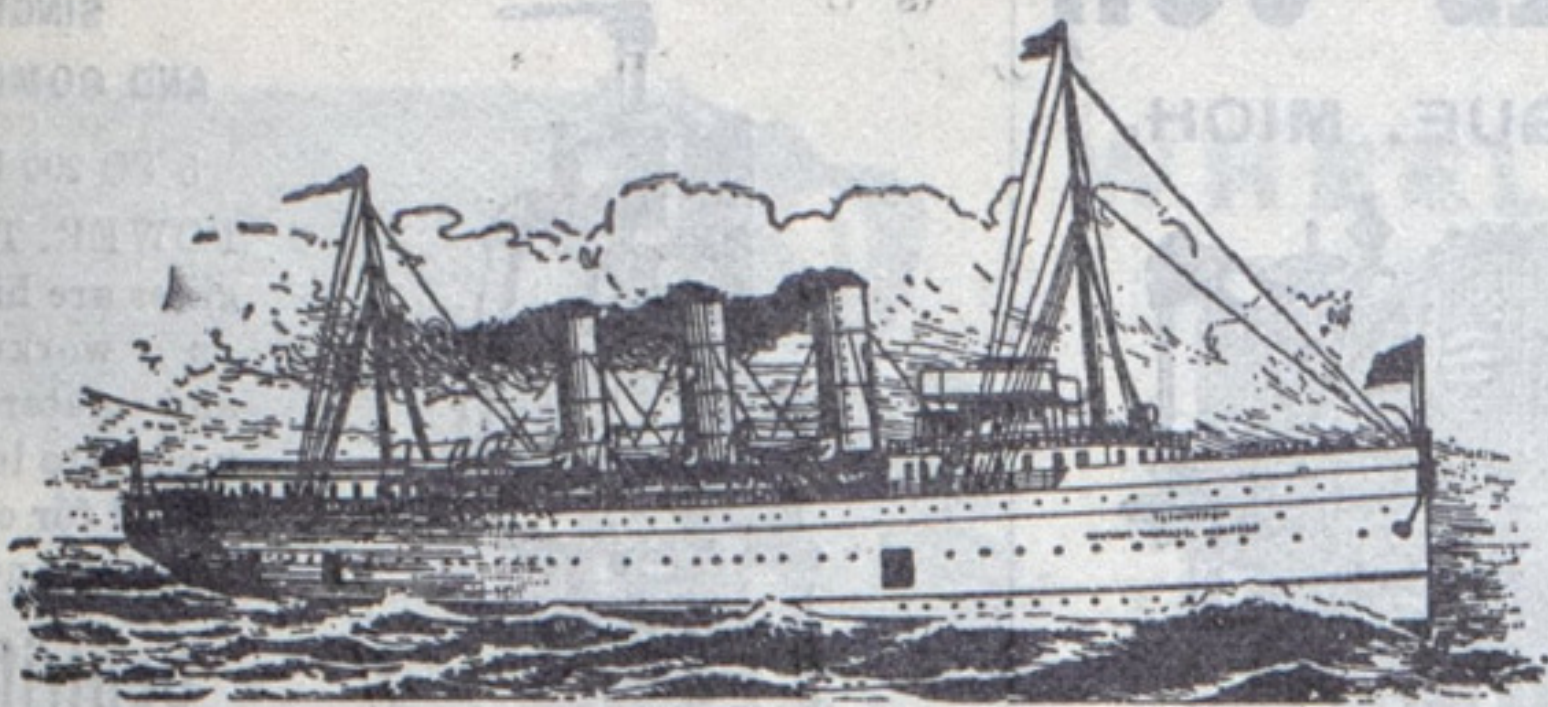
The American Ship Windlass Co., of Providence, R. I., are building a new machine having a number of new features patented recently by Frank S. Manton, of that city. The improvements are said to enable the towing machine or capstan, or both, to be controlled by a steam engine, so that when the machine is in use the yielding power of the motor acting upon it is increased or diminished according to the strain on the hawser, and when the vessel is anchored the yielding power of the motor acting on the windlass or the capstan by which the cable is held in the vessel is increased or diminished, according to strain on the cable, and consequently the cable is relieved from excessive strains when sudden shocks come upon it. A towing machine alone must have means for reversing the direction of motion of the drum in order that the hawser may be paid out at the will of the operator to any desired length.

The twin-screw steam yacht Margarita, belonging to Mr. A. J. Drexel, of Philadelphia, and launched by the Ailsa Ship Building Company, of Troon, in June, ran a series of progressive trials a short time ago on the Skermorie measured mile, and also extended runs between Colch and Cumbrae lights. During the trial the engines worked with smoothness and regularity, and the results were satisfactory. The speed under natural draught of 14 knots per hour was easily attained, and under forced draught it was increased to 16½ knots per hour. A noteworthy feature of the trial was that at both high and low speeds there was an absence of vibration in the ship. An illustrated description of the Margarita appeared in THE RECORD three weeks ago.

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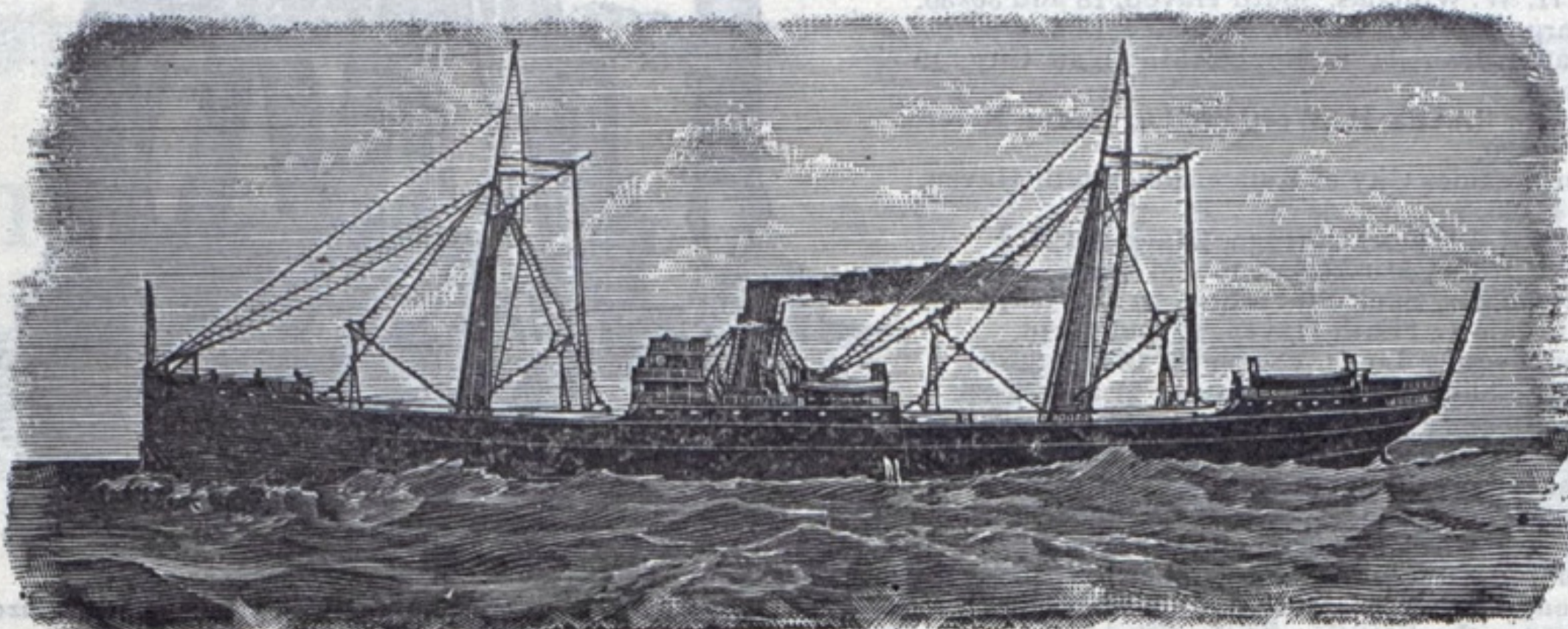
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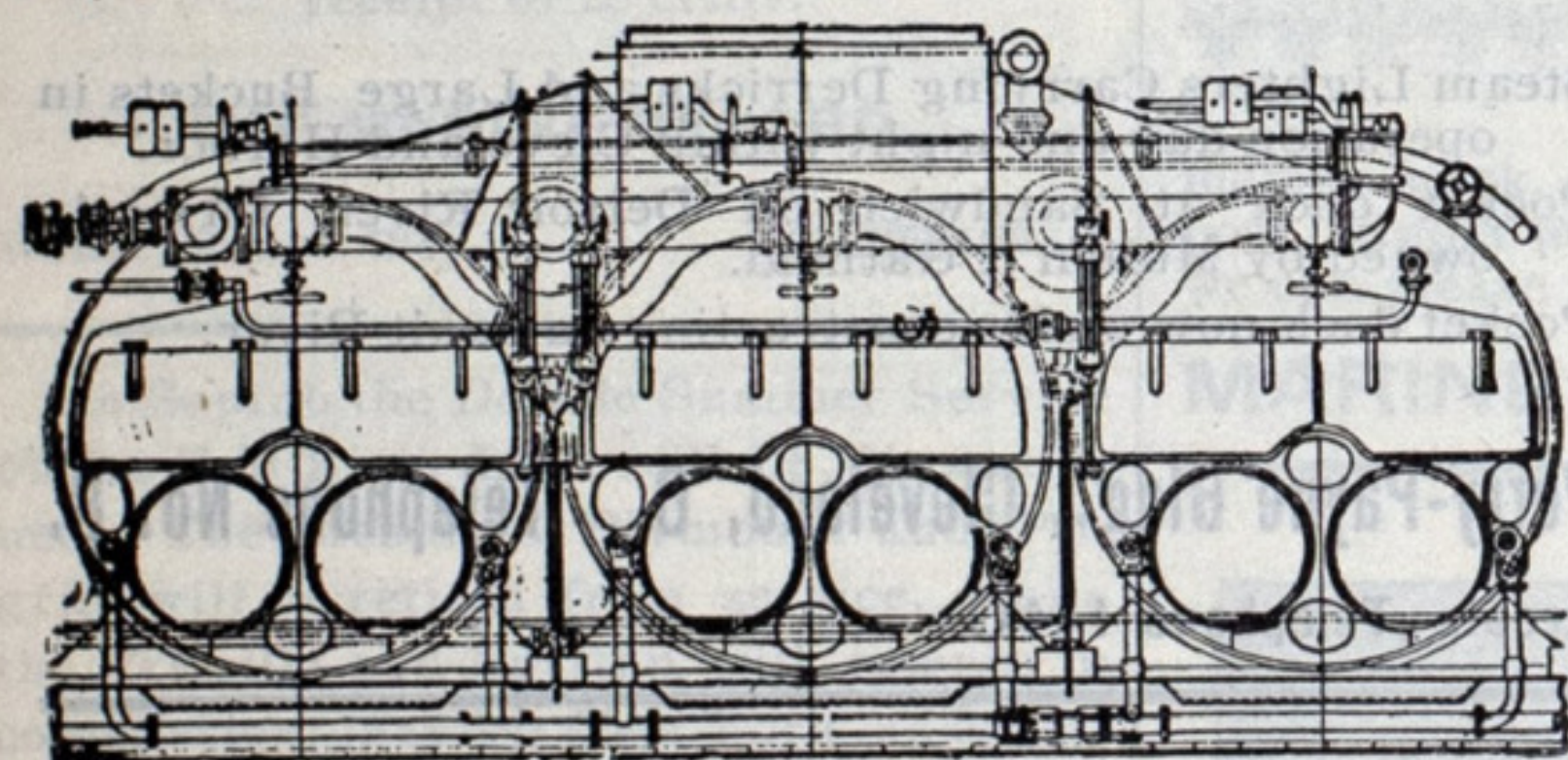
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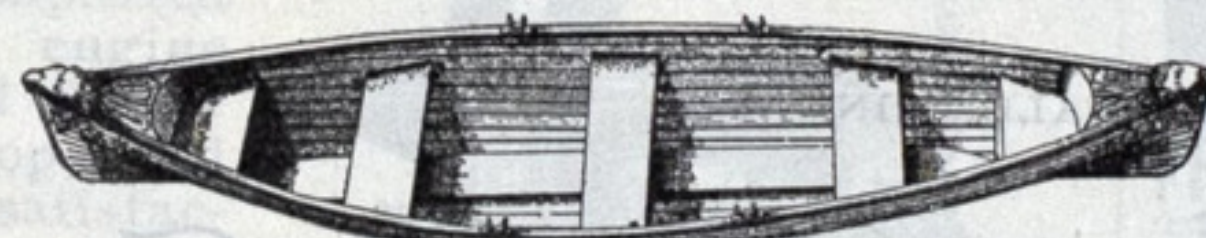
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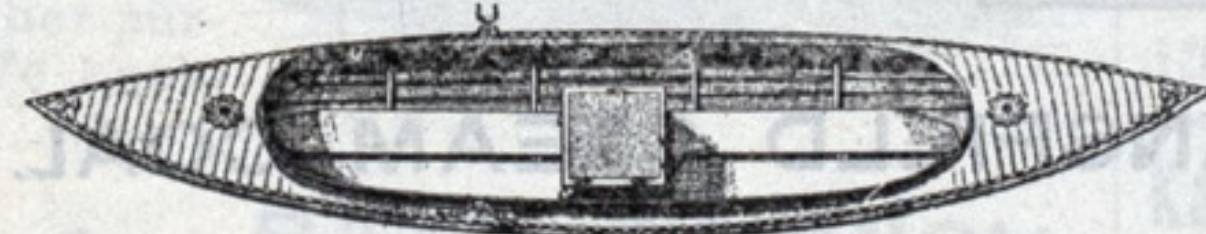
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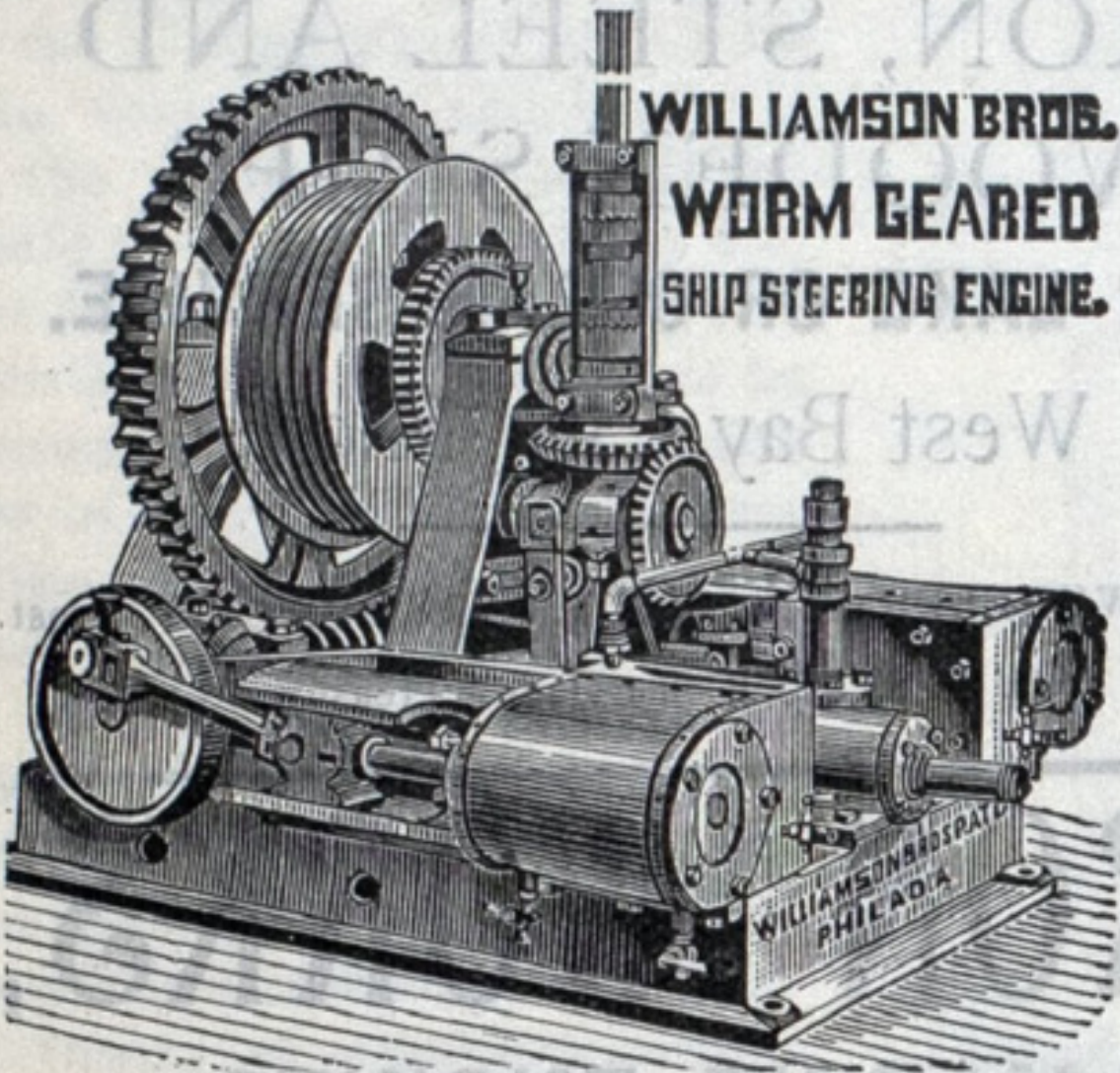
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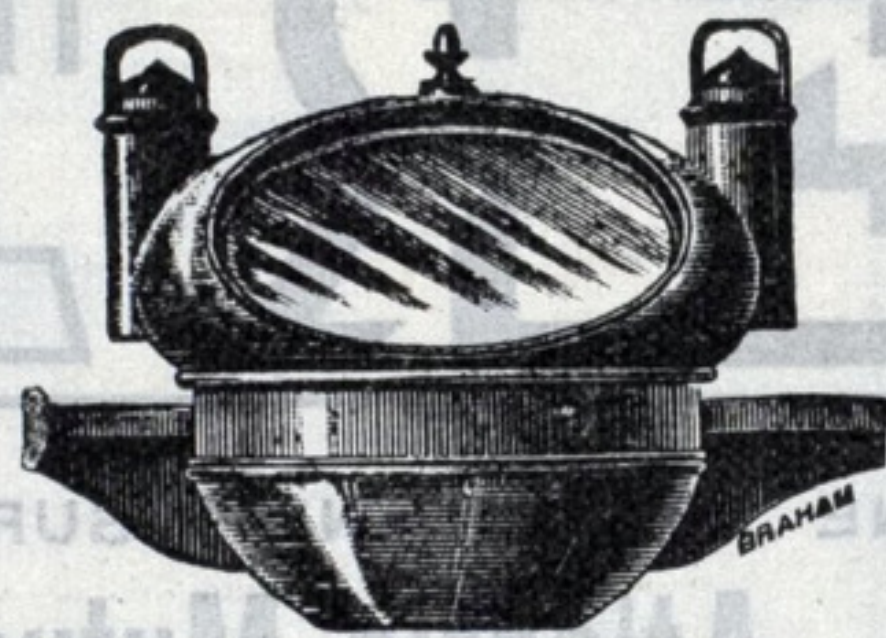
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 Fore and Aft Compound Marine Engines.

The Engines in the following boats are of our manufacture.

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 U. S. Survey Steamer, W. S. Hancock, 12 and 21x20.
 Steamer Pine Lake, Charlevoix, 16 and 30x24.
 Passenger Steamer Pilgrim, St. Clair, 14 and 28x20.
 Steam Barge Iona, Grand Haven, 24 and 46x42.
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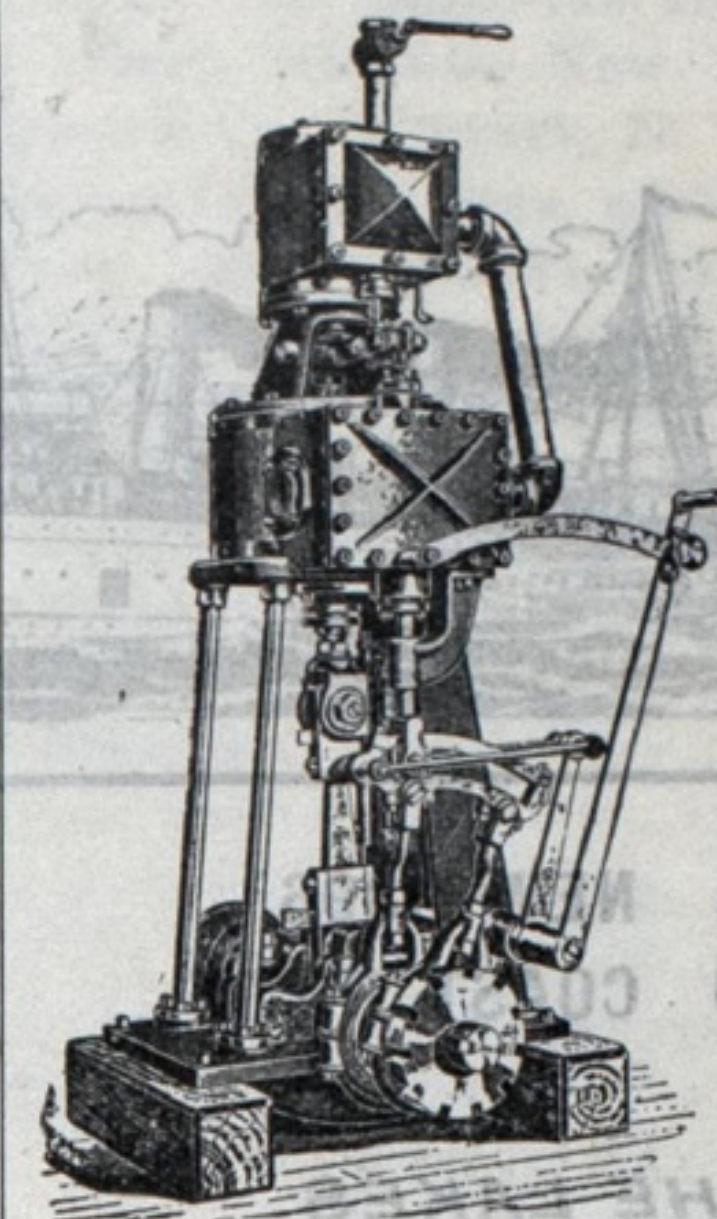
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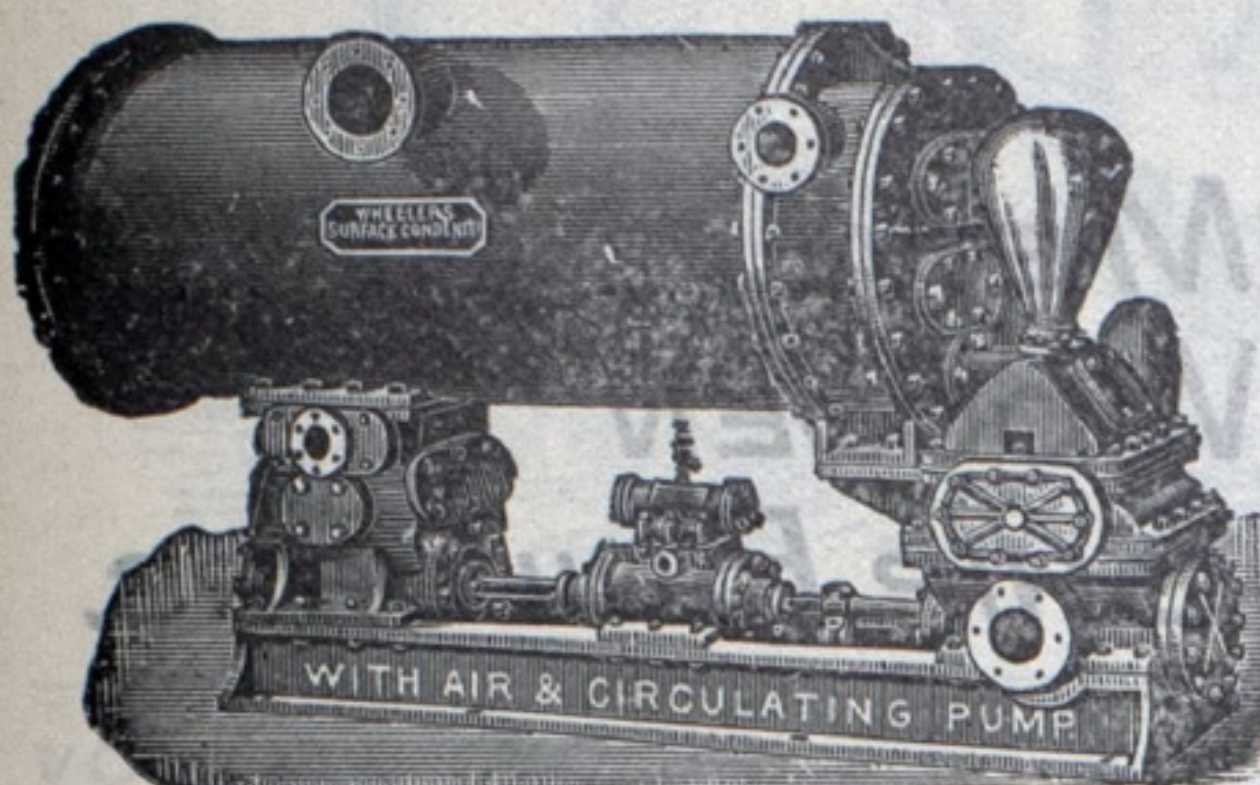
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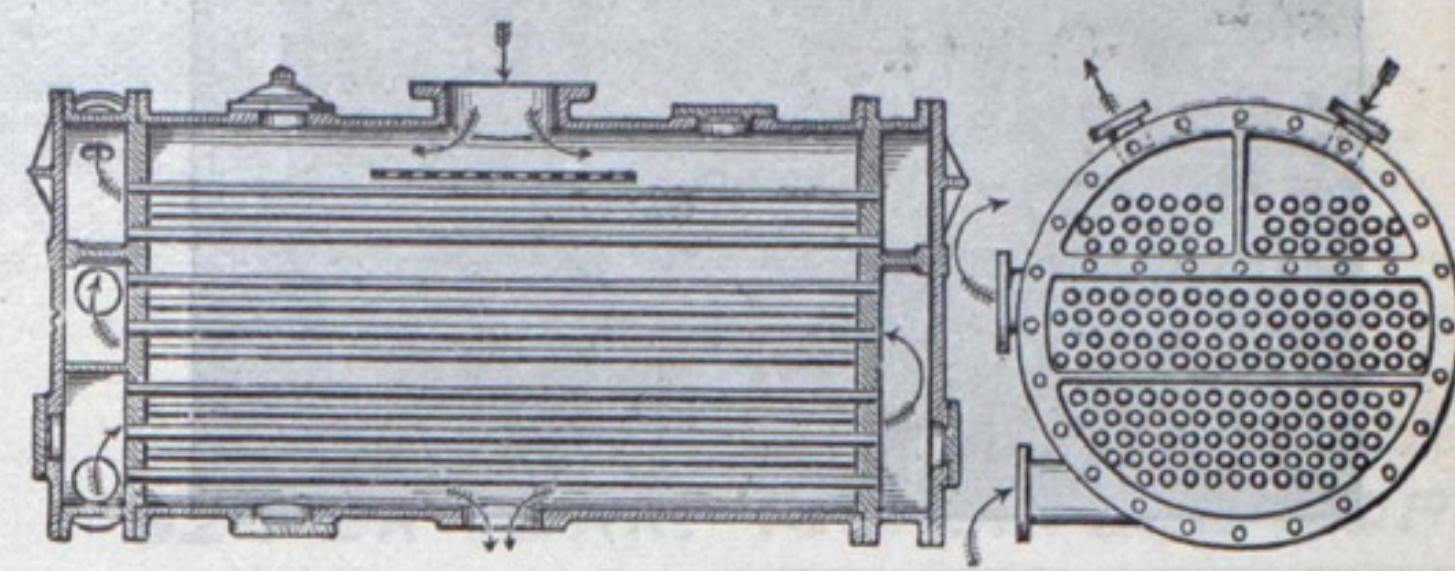
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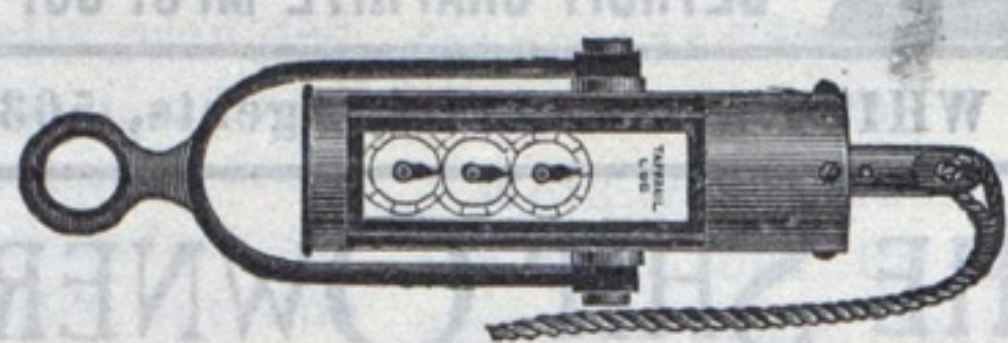
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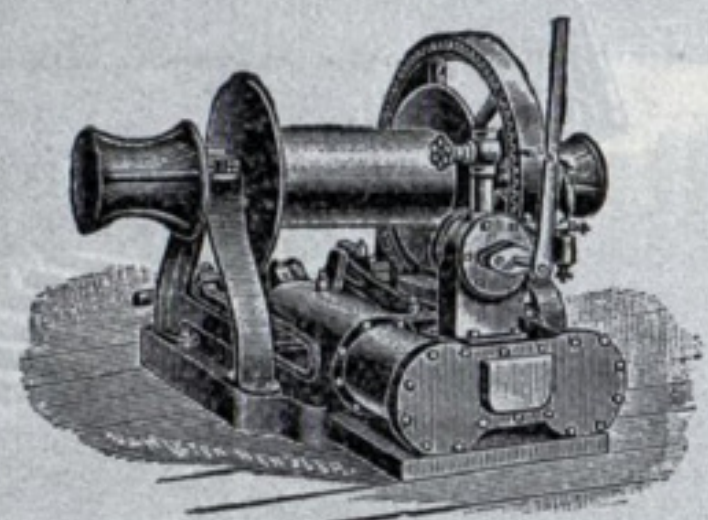
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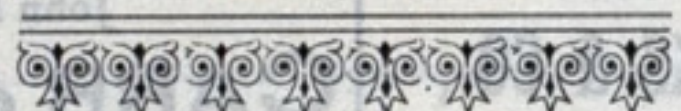
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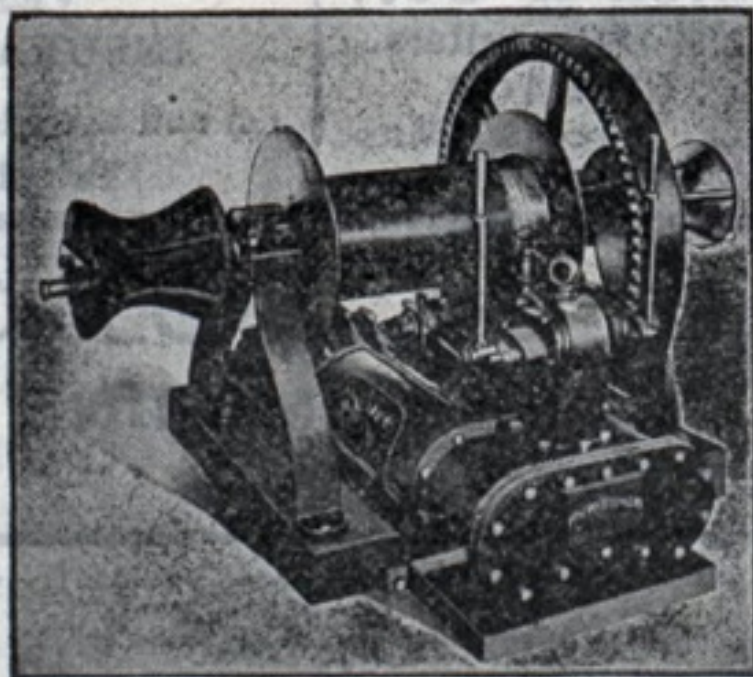
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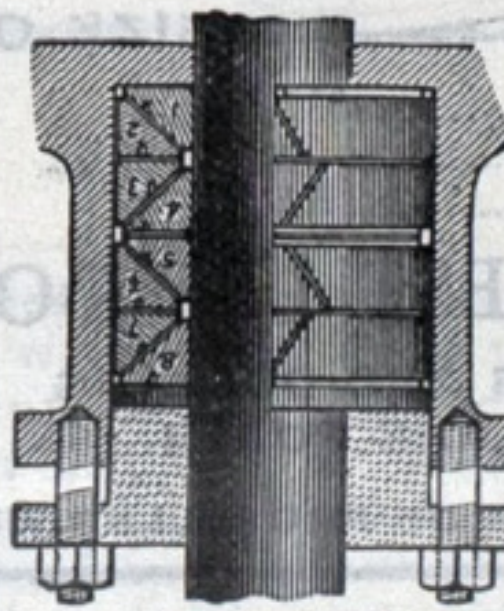
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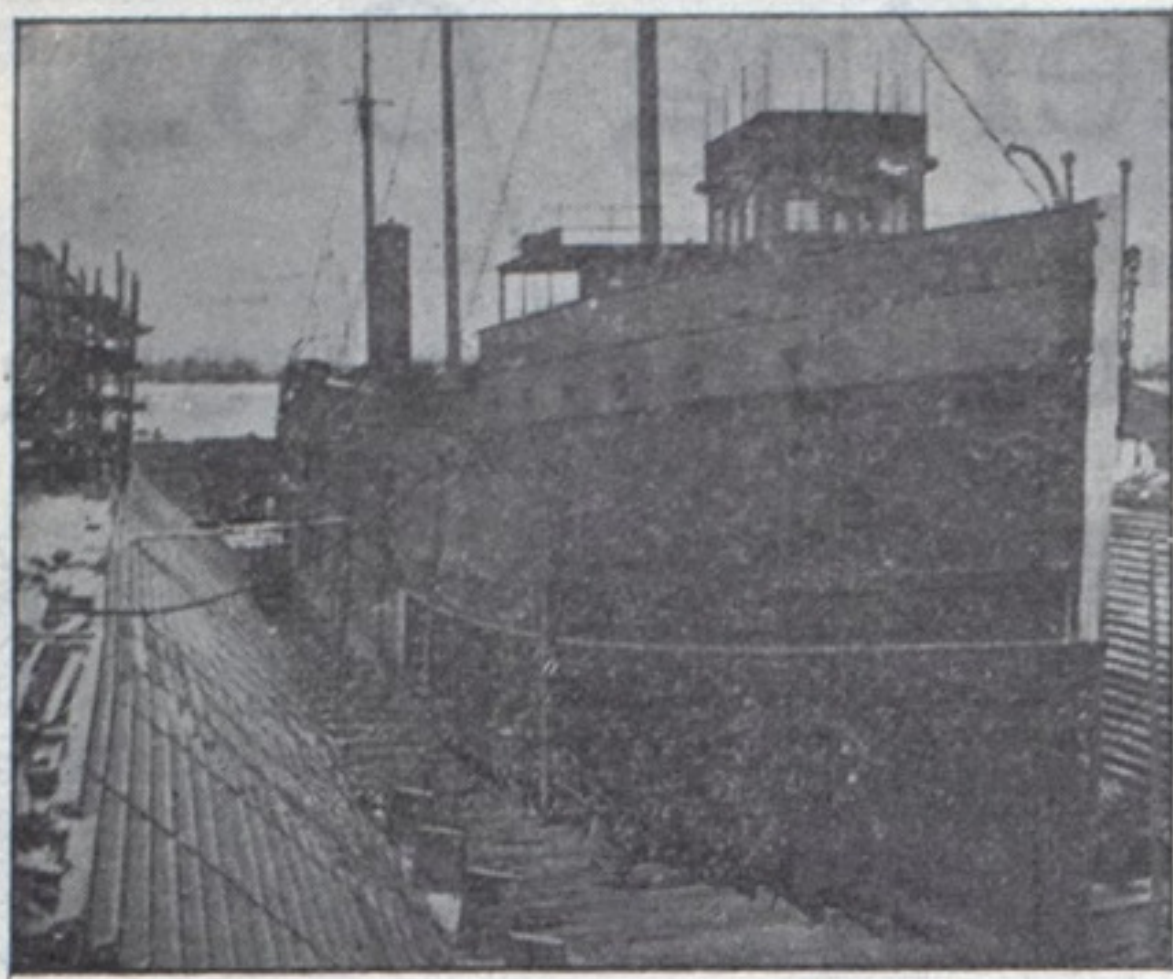
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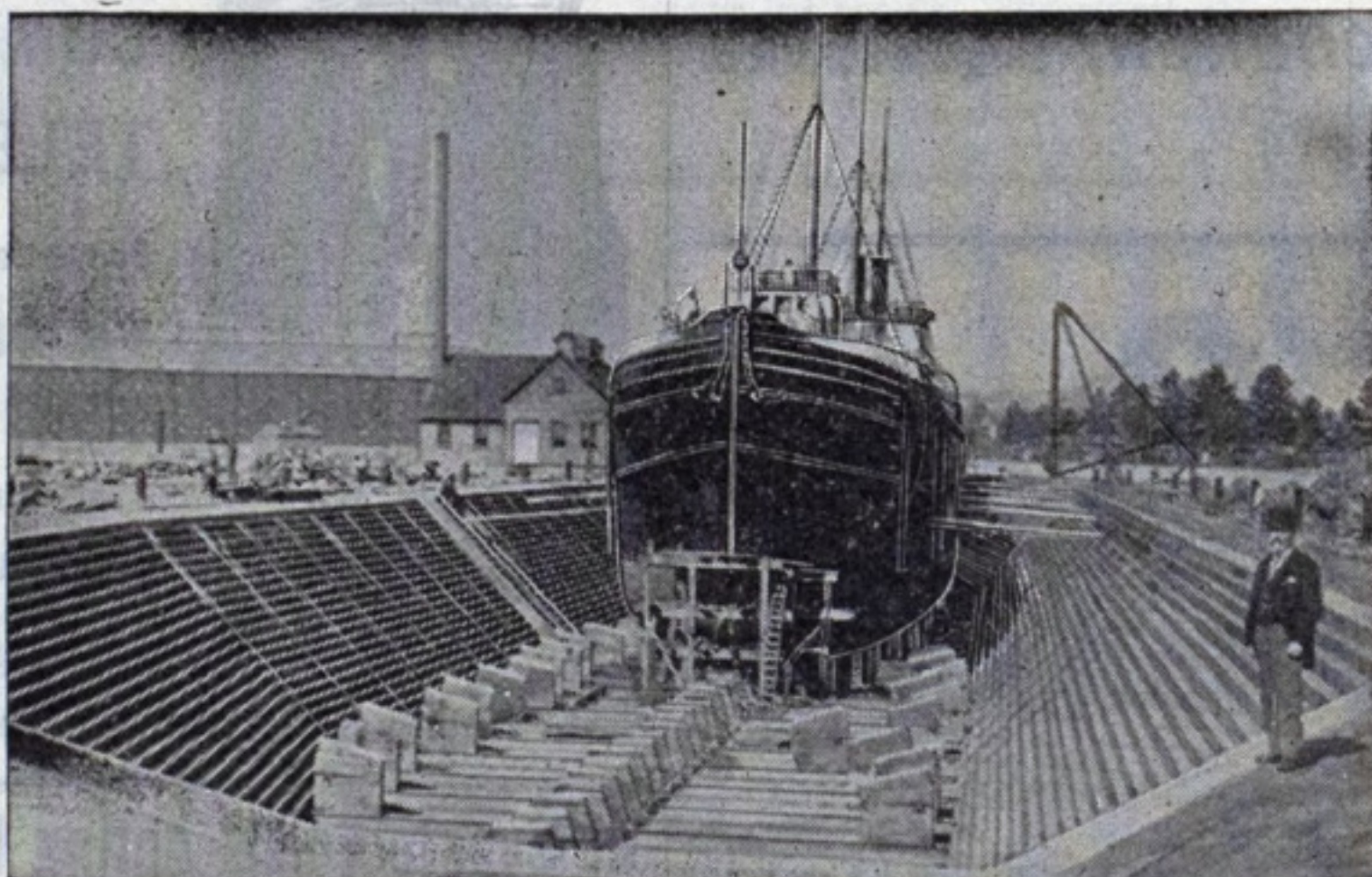
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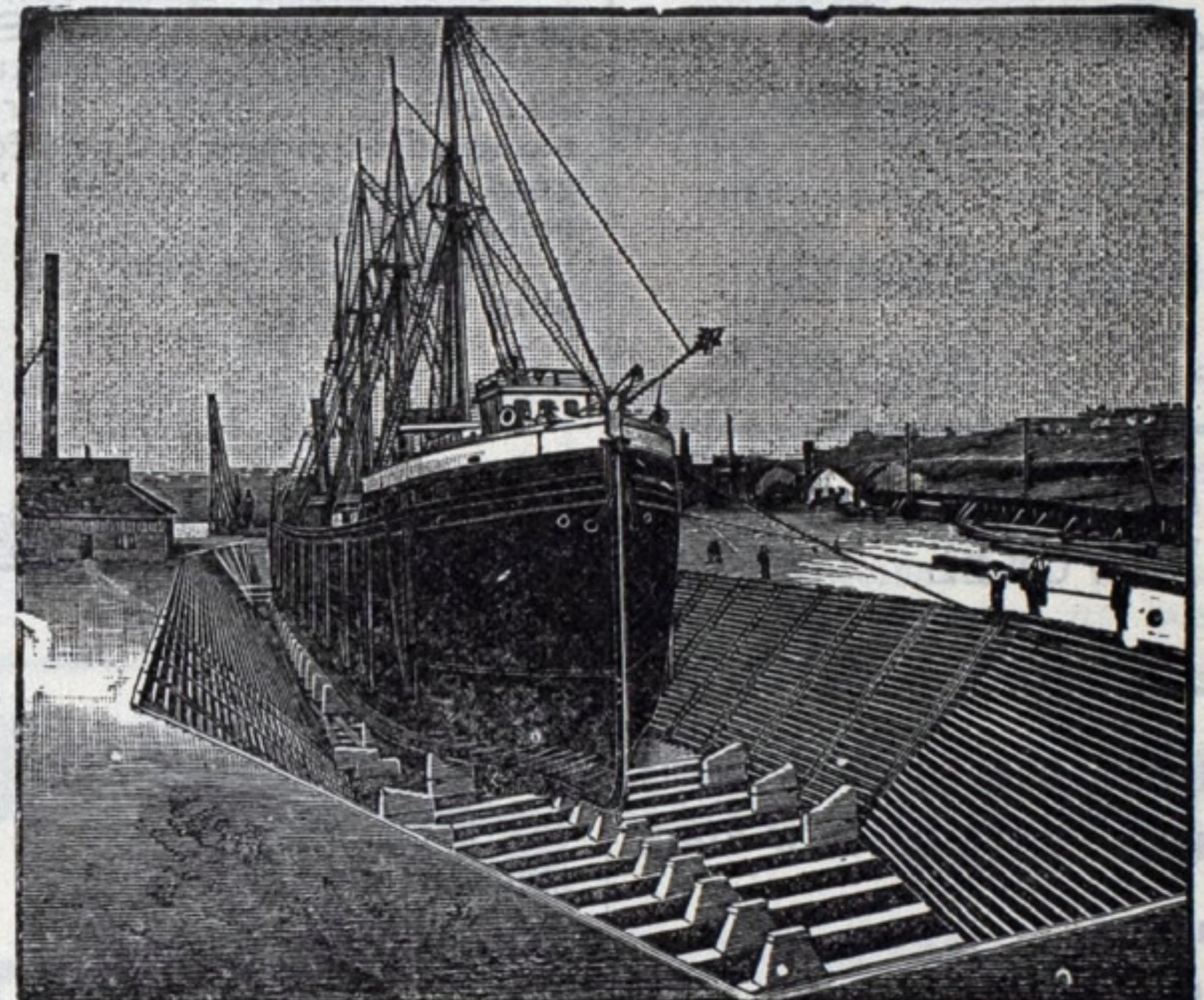
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